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THE ORIGIN
OF THINGS

By the Same Author

THE SAVAGE HITS BACK
TENTS IN THE WILDERNESS

THE ORIGIN OF THINGS

A Cultural History of Man

BY

JULIUS E. LIPS

Illustrations by EVA LIPS

GEORGE G. HARRAP & CO. LTD
LONDON SYDNEY TORONTO BOMBAY

First published 1949
by George G. Harrap & Co. Ltd
182 High Holborn, London, W.C.1

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Dewey Decimal classification: 571

Made in Great Britain. Printed by The Riverside Press, Edinburgh

Preface

THE IMPETUS to write this book was perhaps unique. It seems to me that the social life of an anthropologist is more intimately interwoven with his profession than that of most other scientists. How often at dinners and cocktail parties some one has asked me: "You are an anthropologist? Now tell me everything about anthropology!"

Such a general wish is, naturally, not easy to satisfy, but upon rising from the table the inquirer would at least know that plates and forks, chairs and cosmetics, rings and bracelets, liquors and wines, are no inventions of a recent era, but that they go back to the dawn of time.

But more often the questions have not been of such a vague nature. Not only women but men have wished to know whether hair-styles, lipstick, and the many beauty tricks applied by our modern women are the inventions of the refinements and sophistication of recent times. People have been either disappointed or amused and satisfied to learn that these things are in fact thousands of years old and that even more cunning gadgets and preparations were used by so-called 'savages.'

When conversation, inspired by the events of the day, has turned to more serious matters, like social security and, especially, the ambiguous 'democracy,' these have been shown to be anything but modern achievements—to be, in fact, often rather inadequate imitations of similar systems established by humanity millenniums ago. Experts in modern communication, such as the newspaper and the radio, have been interested to hear that mankind has always found skilful means of notifying the public of important news events efficiently and speedily.

Indeed, I have been surprised at the lively interest shown in such revelations. This interest has been even more pronounced among my fellow-anthropologists and my teacher friends. Their encouragement to tell to the general public the origin of our modern tools, habits, traditions, and beliefs added considerably to the inspiration I began to feel, and many talks with students and younger folks opened my eyes to their specific interests. Naturally, I tried to find out what aspects of human culture are most directly connected with the problems of our time, and the fifteen chapters of this book are the result of my private poll on the special interests and curiosities of men and women in many walks of life.

But all this encouragement in itself would not have induced me to write this book if I had not felt strongly that it is the task of an anthropologist, especially in our days, to work in his field towards a closer understanding among peoples and cultures. The heritage we took over from primitive man is common to all races and nations. The common ground of all peoples revealed by the facts of anthropology should in the end contribute more towards the realization of One World. The early inventors and benefactors of human culture cannot be distinguished by colour of skin, nationality, or religion—they remain anonymous. But most of them have contributed more to human happiness than many a modern statesman.

The Second World War has brought us into contact with almost all peoples on earth, and a new Age of Discovery has aroused new interest in foreign peoples and foreign cultures. The discoveries in nuclear physics, on the other hand, have stressed anew the line of evolution and, perhaps, suggested the possibility of a destruction of all human civilization. This book has been written as a contribution towards the understanding of the development of human culture, and in an effort to promote mutual co-operation between peoples and cultures and, last but not least, in the hope that it may contribute to the realization of the One World for which we strive.

JULIUS E. LIPS

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CHAPTER ONE

Of Home and Hearth and Pots and Pans

LET US GO HOME" is a sanctified expression in any language. The outside world is seen as a struggle for existence, a contest to guard vital human relationships against the ravages of rain and cold and heat and the unpredictable influences of things and people. But inside it is good to feel sheltered among dear ones and to relax amid the intimate surroundings of the fireplace. There is no human race without a deep appreciation of the blessings of home, whatever its shape, and when night falls all human beings on earth—regardless of their particular faiths—like to close their eyes to rest in the spirit of the Cornish 'litany':

> From ghoulies and ghosties
> And long-legged beasties,
> And things that go bump in the night,
> Good Lord, deliver us.

Primitive man living in a world of animated things and ever-present spirits, and finding himself exposed to the immediate threats of nature, feels this desire more keenly than the civilized mind readily understands.

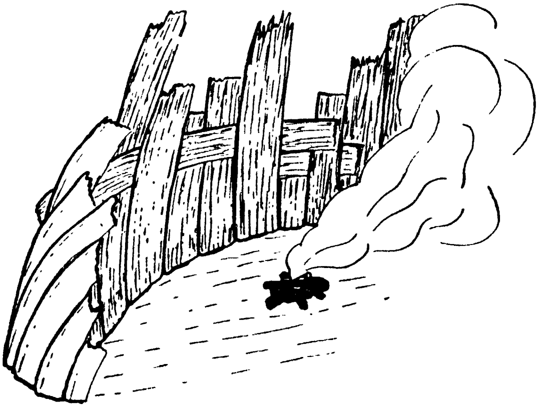
The older, the more primitive, a people, the more extensive is the area they consider their home. To most primitive peoples it is not the more or less temporary structure which shelters the family from night and from wind and rain that is the basic expression of ' home,' but rather the tribal land in its entirety. Any intruder who dares to set foot on its sacred soil pays with his life for his trespass. The plots on which individual families erect their shelters for the night are not important ; the land is their home. The land belongs to all, and all belong to the land which the tribe claims as its own.

What is the form of the most ancient human habitation ? Is the ' cave man ' as depicted in newspaper cartoons really the earliest home-owner ? Not at all. The fact that scientists have found many of the earliest possessions of man in caves, where preservation was best maintained through the millenniums, has misled the layman to believe that the cave was prehistoric man's first solution to his housing problem. This notion is an underestimation of human ingenuity. It makes no allowance for climatic and geographic influences on the choice of shelters.

The existence of caves in a region was by no means a prerequisite of human settlement; more material evidences of prehistoric home life have been found in open places than in caves. Wherever caves or grottoes were chosen as abodes there was a special reason for their suitability, such as the severity of climate at the peaks of the glacial periods like the so-called Mousterian epoch, or the requirements of the hunt for game, abundant in alpine regions. The man of the European 'bone culture' whose prey was the cave bears (*Ursus spelæus*) followed them into the high alps where he therefore made his home. The highest dwelling of this type is the so-called "Dragon Hole" near Vättis (Switzerland), which lies 8000 feet above sea-level. But those contemporaries of this alpine hunter whose game were animals of the lower regions did not dwell in caves. There is no evidence that peoples of the palæolithic pre-Chellean culture, for instance, ever lived in caves. Troglodytism, or cave life, was either a temporary necessity or, even more often, a mere adjunct to the customary life in hand-built abodes. The best-known prehistoric caves discovered and described by modern scientists—Le Moustier in the French Vézère Valley, Font-de-Gaume in the Dordogne, Le Mas D'Azil (Ariège), the grotto of Aurignac (Haute-Garonne), and the ancient Italian and Spanish caves—reveal the very interesting fact that their main purpose was not to serve as family homes but rather as community houses or, if we may use the term in this connexion, as churches. While the space near their entrances occasionally served temporal purposes, the inner halls show sacred paintings of religious and magic significance; and remains of altars with displays of animal skulls indicate clearly that they were halls of worship. Only the front parts of the caves were occasionally used for dwellings, and, even then, the half-open shelter under overhanging rock gables at the entrances was apparently preferred.

Among the most primitive tribes of our time who still live on the cultural level of the Stone Age—and there are many—only the Veddas of Ceylon and the Toala of Celebes show a preference for troglodytic homes, because caves are abundant in their territories. Most tribes equally ancient prefer the windbreak, that oldest 'house' of warm climates, the use of which was very common among the brethren of the 'cave men' of palæolithic times. Its flimsy materials could not survive the millenniums, although the remnants of one such diluvial 'house' were discovered by Forrer near Spichern in the Alsace.

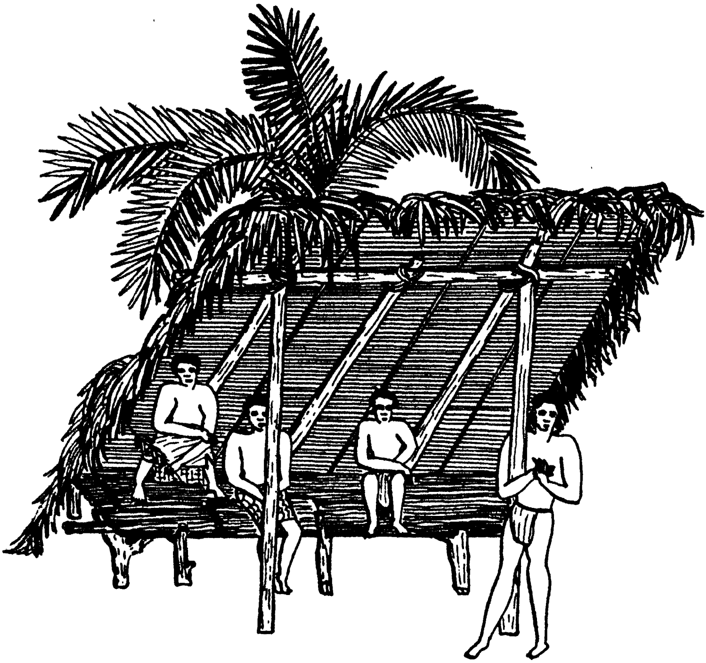
The windbreak consists of a simple structure of trees or branches stuck into the soil to form a straight wall or semicircular enclosure. The framework is covered with brush, leaves, bark, or grass to provide a rudimentary shelter against wind and rain. Those nomadic tribes whose form of economy forces them to roam continuously over large areas choose it for their homes—tribes like the Australians, the now extinct Tasmanians, the Veddas, the Negritos, the Bushmen, and many American Indians. Following the moving herds of their game animals, constantly on the look-out for the herbs, roots, and berries which constitute their food supplies, these people can build or break up their living-quarters quickly. If several families hunt together they build their windbreaks side by side. While on hunting trips the Bushmen find even quicker shelter in their so-called *bosjes* by simply tying together the branches of growing shrubs ; but in the sandy regions of the Kalahari their windbreaks are of more solid construction. Tribes of the Chaco occasionally arrange their protective roofs in long rows and cover them with rush ; the Negritos use grass. The Andamanese shelter is nothing but a windbreak resting on four poles. American Indians such as the Apache build *wicki-ups* of twigs interlaced with brush, and use them as their favourite summer abodes.



TASMANIAN WINDBREAK

After Lips

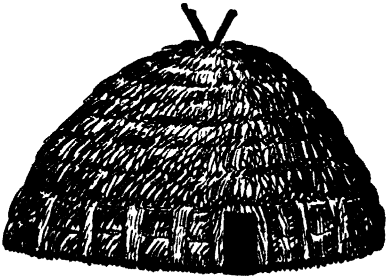
Even this most ancient man-built shelter can be considered a prototype of the fundamental form of the two oldest types of house : the dome-shaped round hut or ‘ beehive ’ and the quadrangular house. The most primitive tribes often prefer the round hut, which is to be found in Australia and among many African and American peoples. Architecturally, it is simply two semicircular wind-breaks, woven together. The quadrangular house, on the



WINDBREAK
Andaman Islands
After A. R. Brown

other hand, was developed by roofing over the area between the two parallel vertically erected windbreaks.

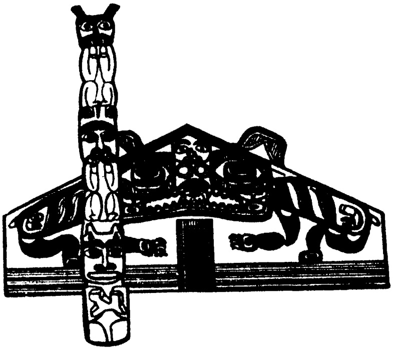
The windbreak and the house forms derived from it are satisfactory only in comparatively mild climates. In cooler regions a dwelling must be constructed of materials better adapted to keep out wind and cold but which can nevertheless be quickly put together. The igloo of the Eskimo is nothing but a beehive hut built of snow and ice bricks. A long, open hallway leading to the outside provides adequate ventilation while insulating the entrance against cold winds. The warm comfort of the Eskimo abode is



'BEEHIVE' OR ROUND HUT

well known, but, as Stefansson reports, " a new camp is warmer than an old one, for a new snow house is a snow house, but an old one is an ice house." Although the building of an igloo takes more time than a tropical dome-shaped hut, it is nevertheless only a temporary home of hunters, which must be abandoned in the spring when the snow on the roof begins to thaw and when puddles of water on the floor make " the interior of every Eskimo house like a lake all summer." The same dwelling may be reoccupied during the autumn when the snow begins to freeze, but this is done only when its former occupants happen to return to the same region.

The Eskimo as well as many other primitive tribes have often been induced by the white man's greed to work in mines and receive, as a reward, the dubious benefits of the civilizers' housing facilities in the form of wooden or tin-plate hovels. The results at Wainwright Inlet, for instance, have been so damaging to the natives' health that the white man himself has had to persuade them to return to the old igloo. Similar experiments have been made in many other regions under civilized influence — in South Africa, for one—and the result has always been detrimental.



QUADRANGULAR HOUSE
Kwakiutl Indians
After H. W. Krieger

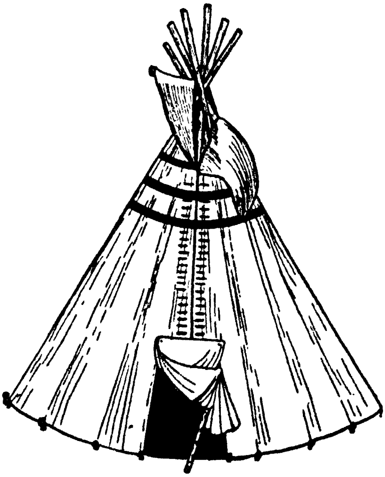
We saw that the windbreak, man's oldest hand-built shelter, foreshadows even in its crudest beginnings the shape of the two principal house types : the dome-shaped beehive and the quadrangular house. But also the tent, another easily movable shelter, has its origin in the windbreak. The different types of tents used by primitive man and by his later imitators of the civilized world are characteristic of nomadic peoples. Their livelihood being derived from hunting or herding, they must be able to dismantle their houses quickly.

The tent of the arctic, subarctic, and related tribes is a conical structure of wooden poles arranged in a circular pattern and covered, according to climate and season, with bark or animal skins. Well known to most of us since boyhood days is the tipi or teepee of the Plains Indians which is of characteristic shape and of especially fine workmanship. What story of 'Wild West' adventure would be complete without mention of the teepee ?

Although its general appearance is well known, its method of construction is not equally familiar, so it may be worth while to quote the description by Waterman :

> In setting up the tipi, two poles were put together in the form of a V and lashed at their intersections with the end of a rope, the rest of which was left dangling. A third pole was then fastened to the apex of the V, and the three were raised into the air to form a tripod. This was the foundation of the tent. Additional poles were carefully laid in place, the women—for this was women's work—tossing a turn or hitch of the rope over each new pole and binding the whole firmly together. The cover was next hoisted into place and stretched around the framework, being pegged down to the ground all round. The cover was so shaped that at the top of the tent there was an opening left for the escape of the smoke, and flanking the smoke hole were two flaps known as " ears." The distribution of this type of dwelling was dependent upon the distribution of the buffalo. A whole tribe would sometimes hang on the flanks of a buffalo herd, moving as the herd moved.

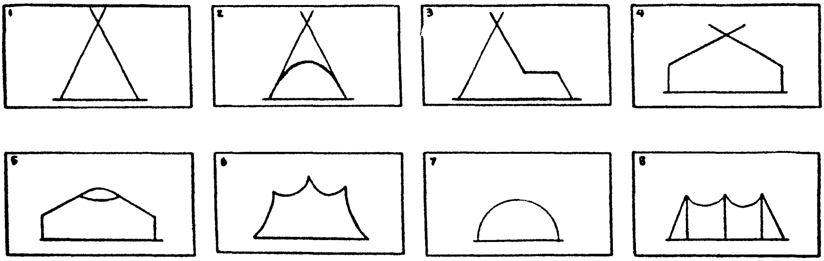
Each detail is given the greatest of care, and although the main characteristic of the Indian tent is its mobility, the precision of all its parts in assembly never suffers. The layman occasionally confuses the teepee with the wigwam of the Algonquian - speaking peoples of the Atlantic side of the North American continent. The wigwam is no tent, the word merely meaning ' dwelling.' It is a conical lodge with an arched-over roof of the type which the Sac, the Fox, and other Indian tribes still occupy to-day.


TEEPEE
Plains Indians

The tents of the Indians of the interior of Labrador, like the Naskapi, are not quite as elaborate as the Plains Indians' teepees. Their ground plan, however, is the same. In the wilderness of the present-day hunting grounds of these tribes which have remained unchanged through the centuries many an old hunter still covers his tent with caribou skins in the winter and with birch bark in the summer, stitching the pieces together with a bone needle and carefully tailoring them to fit the pole structure. But in the Hudson's Bay Company posts modern Indians obtain in exchange for their precious furs the white man's heavy duck cloth to cover tents, whose main structure follows that of the olden times with only the addition of a horizontal roof-tree. Such a tent lacks the beauty of the older models whose naturally blended aspect is achieved by skin and bark, but when it is snowed on there is nothing to indicate its machine-made shoddiness.

The tents of the Lapps, the only arctic tribe of Europe, are very similar to the North American varieties. During the summer these *goattas* are abandoned for more convenient log huts of light construction which, however, maintain many of the structural features of the tent. The Russian Finns and the peoples of the Amur region still put two windbreaks together to form a saddle-shaped roof. The felt- or leather-covered *yourtas* of the Central Asiatic nomads are low and spreading and usually erected over pits in the ground. These dwellings are used by many tribes throughout Central Asia extending to the borders of Tibet. The black tents of the Tibetans, loosely woven from the hairs of the yak, allow a veiled view of the outside, although they are completely waterproof. The tents of the North African desert nomads have a rectangular ground-plan, and are covered with palm leaves or with animal skins. South American nomads of the Patagonian Plateau, the Tehuelche and the Tsoneca, use similarly convenient fur-covered tents.

PRINCIPAL TYPES OF TENTS



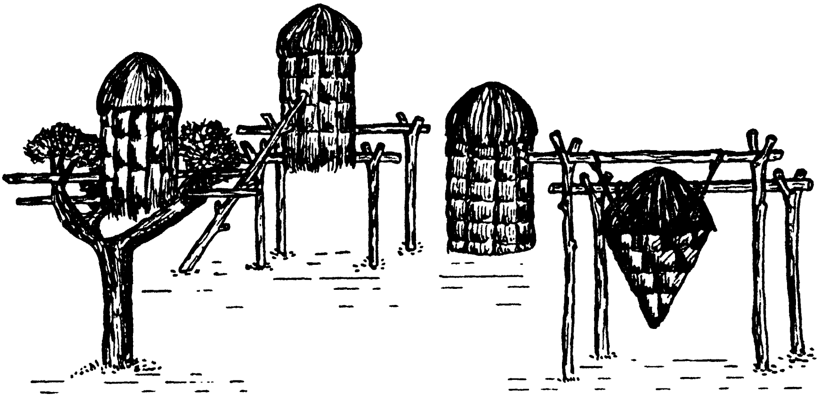
1. Northern Asia
   North America
2. Lapps
3. Eskimo
4. Palæo-Asiatic Tribes
5. Asiatic Herdsmen
6. Herdsmen of Tibet and Arabia
7. Lake Chad region, Somaliland
8. Patagonians, Araucanians

After Montandon

The white man with all his resources has not been able to invent anything more practical than the tent for hunting expeditions, or for housing mobile troops even in this age of mechanized warfare. Boy Scouts and Girl Guides learn to appreciate nature while camping in the tent, and many of us may have protected our picnic grounds or camp-fires with a quickly erected windbreak without recognizing its venerable past. The skilled arctic hunter, Indian or white, still knows the art of erecting an overnight shelter by arching interwoven brush and trees, which he then covers with thick layers of snow and ice.

All these ancient types of temporary shelters have the common characteristic that they may be rapidly constructed from materials at hand or assembled and dismantled with transportable materials. But what were the first sturdier structures like ? What are the forerunners of the house as we know it ? It may seem strange, yet it is of significance, that the first more solid constructions were not erected to shelter humans, but to protect and preserve the collected wild-plant products on which their sustenance depended. A large group of tribes, especially of Australia and America, lives partially or exclusively on one or more wild plants whose seeds, roots, bulbs, or tubers provide their food during almost the entire year. Although still ignorant of agricultural cultivation, these harvesters derive their livelihood from the abundance of the wild fields which nature has provided at certain spots on their lands. It may be that wild roots grow there by the thousands, or that wild rice fields or wild acorn groves furnish the available food ; in any instance, peoples who gather them are vitally concerned with their preservation. These tribes no longer live from hand to mouth ; they guarantee their future economic security by the preservation of wild products. Close to the harvesting fields they erect caches and storage houses solid enough to protect the precious wild harvest, while they themselves continue to live in dwellings of a more or less flimsy construction. The storage houses of, for instance, the acorn harvesters of California are substantial structures with thatched roofs of conical shape.

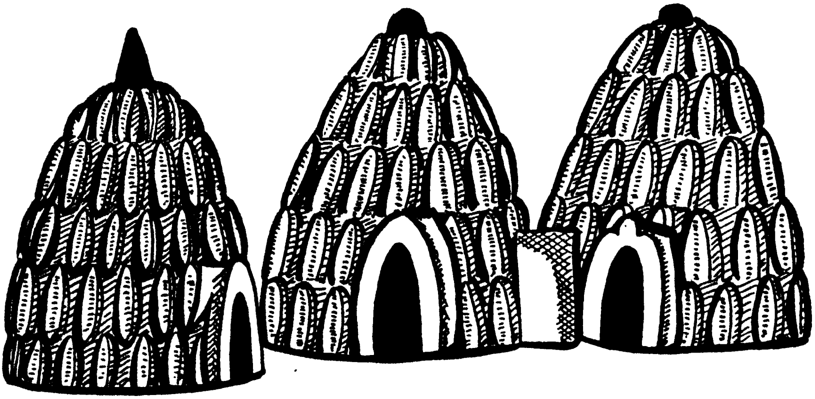
A permanent family home for early peoples is a luxury to be afforded only by those who settled on the land as agriculturists. Only they could develop comfortable living-quarters in our sense of the term. From the simple square or quadrangular house there was successively devised a great variety of dwellings, especially thatched, solid huts with gabled roofs and of larger dimensions than the older types of habitation. This kind of abode, the first ' firm ' house, appeared in Neolithic times during the so-called Campignian period. In living cultures it is the home of those simpler farming societies that are forced into a settled way of life by the necessity of waiting for the ripening of the crops they plant. In regions of mixed cultural influences the houses of agriculturists may assume many variegated forms, with oval or square ground plans, the latter occasionally with pyramidal roofs ; or they may be erected on trees or piles. For the first time there appears a strong emphasis on efforts to beautify the inner and outer appearance of the home. A greater variety of materials is used to insure the solidity of the structure. A few branches or wooden piles are no longer considered sufficient to build a house ; soil or clay or manure is skilfully blended with straw and grass and other binding materials to produce walls that are able to withstand the change of the seasons. The house, no longer a temporary shelter providing occasional protection, begins to be filled with a greater wealth of belongings, and the increasing sedentariness of the dweller and owner creates the opportunity for community life. For the first time, larger groups of people dwell together permanently. Common interests and a generally more sociable attitude create the need for a public meeting place. This leads to the construction of community houses where the men hold conferences and where musicians and story-tellers entertain the entire tribe.



STORAGE HOUSES FOR ACORNS
Miwok Indians, California
After Schmidt-Koppers

A West African Pangwe man who marries immediately goes to work to build two houses : one as the main domain for his wife and children ; the other, a larger one, as an assembly house where he passes most of his time except for meals and night-time spent with his family. As the family grows the settlement grows with it, and is often so neat in appearance that Tessmann compares the individual homes with " doll houses, fresh from the box."

Especially in Africa, the covering of the basic wooden structures with clay and similar materials has produced shapes of picturesque attractiveness. Among the master-builders of such homes are the Musgu of northern Merun. In the Niger region houses with a square ground-plan and a flat roof are preferred ; these have been adopted almost without any change by the high-culture peoples of Anatolia, Persia, and the central and north-western provinces of India. Even sun-dried bricks were used at an early date, although these primitive agriculturists who know the art of baked earthenware have not yet acquired the knowledge of the baked bricks. Clay as a building material also plays an important rôle in the house-building of many Central and North American Indians, among them the Navaho and the Pueblo.



CLAY HOUSES
Musgu, Cameroons, West Africa
After G. Buschan

Human imagination applied to factors of climate and geography provides almost boundless variety to the homes of the agriculturists. Settlement near a lake shore or in swampy land has resulted in the construction of houses on piles. Pile houses, however, are also built in dry regions, but in such cases this construction is used for protection against hostile invaders. The pile houses of New Guinea, elevated four to ten feet or higher, are constructed in harmonious and spacious patterns.

Pile structures have been known to man since the dawn of time, as the remnants of the habitations of the prehistoric Lake Dwellers prove. They were built in Europe at a time when caves were still occasionally used for temporary quarters. Most famed among these ancient settlements are the homes of the Lake Dwellers who lived in a region comprising parts of modern Switzerland, Germany, and Italy during the Neolithic period. These homes even had their watch-dogs, the *Canis familiaris palustris* breed. The solid wooden floors show inlaid ornamentations of birch bark ; remains of bast mats have been found ; and many luxuries, preserved through the millenniums by favourable circumstances, testify to a high standard of living. Outside Europe the prehistoric builders constructed pile houses in Eastern Asia and in Indo-China. These houses were arranged in groups, usually in rows, just as they are to-day in the villages of the South Seas. In Borneo occasionally the whole village community dwells in a single house, which may extend for a length of more than one hundred yards. Similar 'great-houses' belonging to prehistoric times have been excavated in Europe, especially in the Ukraine. Long communal houses are the customary living-quarters of many tribes in Indonesia and in South America, where they usually house an entire sib of as many as one

TUKUL (DWELLING)
Upper Nile
After Bernatzik

THATCHED HOUSE
Batak, Sumatra
After Gendreau

hundred people. Or an entire village community may dwell in two or three such houses arranged round a central square. A Papuan house of New Guinea was two hundred feet long and forty feet wide. It was equipped " with a central hall, which runs the entire length of the house and is reserved for the use of men ; on either side are the walled-off rooms. These consist of three storeys. In the lowest of all the cooking is done, the middle one is for the women and children, and the top storey for the men."

HOUSE-FRONT PAINTING OF A BEAR
Tsimshian Indians
North Pacific Coast
After Boas

Indian tribes of Alaska and British Columbia lived in houses " large enough to shelter two or three generations and two or more social classes. The house floor was arranged in concentric platforms, each succeeding platform two or three feet above the one beneath. Long and thick retaining slabs of hewn cedar formed the retaining walls of each platform." Such homes of the Tlingit had picturesque names like 'the-spot-that-looks-good,' 'place-where-you-can-swim-through,' 'bear-man house,' etc., recalling the houses of mediæval France whose names were derived from their painted posters like 'House of the Grinning Jester,' 'House of the Jumping Fish,' and Balzac's immortal 'House of the Ball-playing Cat.'

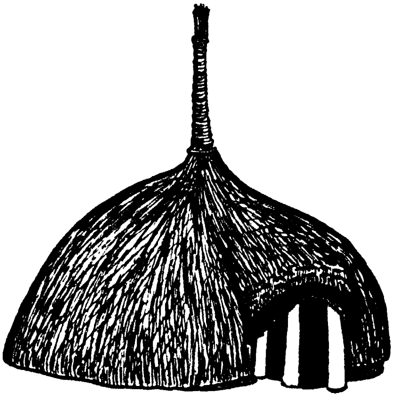
The cliff dwellings of the Pueblo constitute another variety of the primitive house—some of them resemble nothing so much as the sky-scrapers that tower above New York and are considered marvels of modern ingenuity. African counterparts of the Pueblo dwellings are the rock houses at Medinine in Tunisia which have carved-out rooms side by side.

The structure of the Pueblo *mesas* and similar ancient structures like the Crimean cliff dwellings, the cone dwellings of Cappadocia, and the cavate lodges in Arizona, clearly indicate that a decisive motive of the villagers was defence against intruders or enemies. Where nature's rock formations have not fortified a place, man has done his best to build earthworks or similar protective devices. African villages are often surrounded by mighty walls or palisades, and most elaborate measures were taken for protection, especially during the times of the great slave hunts. In the old Sudan cultures houses were often completely subterranean. To-day most homes in the Niger region are sunk in the soil. The Banda of French Equatorial Africa build their houses in strategic locations, to facilitate a close watch over the surrounding terrain. These houses are equipped with entrances so low that the visitor has to crawl on hands and knees into the 'parlour.' In the eastern Mbamland of the Cameroons the remnants of the gigantic fortifications erected by the Fullah, the Wute, and the Tikar speak a vivid language of the past. Their palisades had massive gates and strong clay walls up to twenty feet high, with embrasures through which the defenders hurled arrows and spears upon attackers.

HOPI CLIFF DWELLING
The ancient town of Walpi
American Museum of Natural History, New York

The tree houses of New Guinea can be reached only with the aid of rope-ladders which are pulled up during the night. Where doors or their primitive equivalents are known, mechanisms have been devised which make opening them a job for 'insiders only.' 'Latch-keys' made of wood may assume such tremendous dimensions that no husband could possibly succeed in concealing one in his pocket when he goes out at night.

If we judge the homes of primitive man from an æsthetic angle the peoples of Polynesia may well carry off the prize. The Maori of New Zealand, for instance, transform their square houses into impressive monuments of art. The canoe-shaped roofs, thatched with reed, grass, or palm leaves, are supported by carved pillars of exquisite beauty. A great variety of forms shows the high cultural level achieved by these islanders. From the simple, mat-covered huts of the common people to the artistically fashioned homes of the wealthy, a wide range of ornamental styles and construction is represented ; and the *whara*, or community house, is a treasure of artistic workmanship and taste. Hawaii, Samoa, Niuafoo are names which stand for the finest architectural and artistic achievements reached by primitive man ; and the colossal stone statues of Easter Island and the prehistoric basalt ruins of Ponape — still shrouded in mystery — are remnants of bygone grandeur. The pyramid-shaped ‘ stages ’ or storage houses of the Maori, on which food was piled in gigantic quantities for the convenience of the guests attending the *hakari* festivals, reached heights up to ninety feet, with bases thirty feet square supporting sides that tapered toward an apex.



BANDA DWELLING
French Equatorial Africa
After Daigre

When the time had arrived that man began to record his own history the old high cultures were taking shape. Large groups of residents concentrated in communities which no longer had the appearance of mere villages. New and stronger tools permitted the use of the hewn stone for human dwellings and public buildings ; the palaces of the rich began to mark the differentiations of castes and classes—the city was born. Wealth and power manifested themselves in monuments of towering height, built as demonstrations of might for ages to come.

The houses of the Aztecs of ancient Mexico varied from the branch-covered huts of the hot regions to the brick houses of the highlands, culminating in majestic temples and palaces. The houses of worship built by the Maya of Guatemala were even mightier.

The buildings of these ancient peoples, erected for ' eternity,' have never been surpassed. Even to-day the pyramids of the Egyptians still rank among the seven wonders of the world ; and we have not yet learnt to duplicate their art of cutting stones with such precision that they can be joined without mortar for everlasting durability. The temples of India and China and the ruins of Ur are evidences of such skill and wealth that our civilization of mechanized haste can but humbly admire them. We have been equally unable to mix mortar of the quality used in the Roman viaducts, palaces, and monuments. Our present-day trowel is of the same shape as the Roman, because it is the perfect shape.

CARVED HOUSE POST
Maori, New Zealand
Museum of Ethnology, Cologne

From windbreak to penthouse, from tree hut to fortress—the development of the buildings erected by the hand of man reads like a saga of might and intelligence. Yet even the most modern house in order to be habitable still depends on an elementary force which was given to earliest man by the gods. This eternal gift is fire.

No home, no tribe, no human life, would have been possible without the blessings of fire, that mysterious brother to the sun. Its importance is so paramount in the human mind that there is no people on earth who does not have tales and sagas to explain its origin. It is considered so precious a treasure that many myths relate that man had to pilfer it from gods who were unwilling to share it with the mortals. According to the Greeks, Prometheus stole it from Zeus and suffered horrible punishment in consequence. To some primitive Australians, the thief was the wren, a tiny bird, who brought the divine spark from heaven under its tail. Other Australian tribes believe that the fire was stolen from two superhumans who tried to withhold it from man ; or that a raven snatched it from the top of the digging stick of Karakaruk, one of the virgins later transported to the skies where she stands now in a cluster of stars known to the white man as the Pleiades.

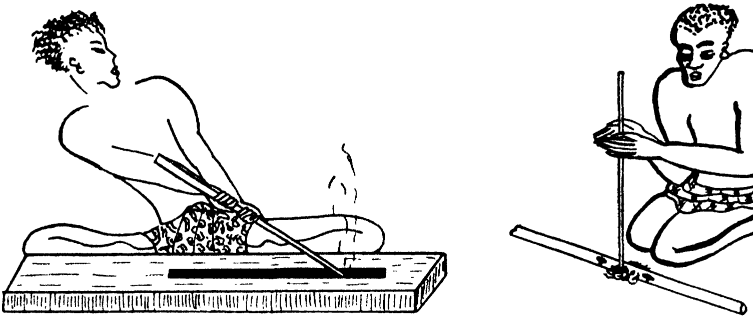
To many peoples with written and with unwritten histories fire is holy. In India the god of fire, Agni, is the messenger between man and his gods who carries the sacrificed souls from the alter of fire up to the immortals. The Parsee Zoroastrians worship the creator of the world by the symbol of fire, " because it is the most perfect symbol of the Deity, on account of its purity, brightness, activity, subtility, fecundity, and incorruptibility." The Germanic tribes honoured the element in their solstitial fires. In our own Bible God appeared to Moses in a burning bush, and the Holy Ghost materialized in the form of a flame. Needless to say, the flowering imagination of primitive man has glorified the great phenomenon of fire by countless myths, many of them of stirring beauty and all revealing a sense of veneration. Maui, the Polynesian god-hero of the Maori who lifted their island from the sea, is also the bringer of the fire. The African Herero combine ancestor-worship with their worship of the holy fire which burns in the homestead of the *oruzo* or priest and is kept alive with sticks of the sacred Omumborombonga tree (*Lombretum primigenum*), the dwelling-place of the ancestral souls. The girl who tends this holy fire must remain unmarried like the Roman Vestal Virgins. The life of this fire is identified with the life of the tribe. If a foreign chieftain gets hold of it he becomes the master and protector of the Herero, as happened in 1850 when many Herero ' took the fire ' of the Maherero and thereby became members of the latter tribe.

In the hearth of each Buryat tent lives *gali ezen*, the fire spirit, who is " of human shape and only small in size while in the hearth." No rubbish, dirt, or other refuse may be thrown into the fire—this would insult his feelings. No knife or pointed tool must be used to stir the fire ; it might blind *gali ezen* and render him unable to chase the evil spirits away from the hut. He receives sacrifices prior to all other gods. The fire is the property, nay, a part of the sib itself. No foreigner is allowed to take fire from the hearth, and if a visitor has lit his pipe while in a Buryat home he must empty it before he leaves.

Numerous are the devices to kindle the precious element ; early ingenuity invented many methods to bring forth the revered spark.

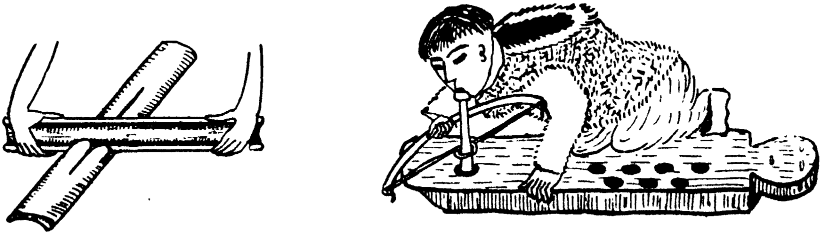
The Australians produce it by drilling, twirling, or rubbing a wooden stick on a wooden base or by 'sawing' a soft log with a boomerang of hard wood. When the chipped-off wooden particles begin to smoulder they are caught with tinder and fed with dry grass until a flame is produced. The fire-borer is a round stick which is twirled round within depressions made in another stick. The twirling continues until smoke appears in the sawdust, and the tinder, after being gently blown on, breaks into a flame. Two bamboo splints serve as another type of fire-saw. One has a groove surrounded by tinder, the other is moved back and forth along the groove in a saw-like motion. The Polynesian fire-grater is another variety, consisting of a piece of pointed hardwood with which a softer log is rubbed until the sawdust begins to smoulder.

METHODS OF KINDLING THE FIRE



Fire-plough

Twirling Fire

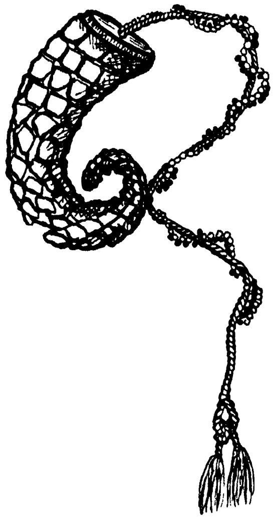


Fire-saw

Drilling Fire with Bow-drill

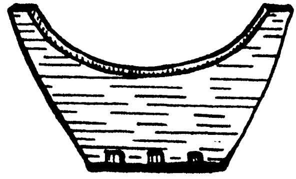
The distribution of the drilling method is world-wide—from the African Bushmen to the North and South American Indians. Ingenious variations are the cord drill, the bow drill, and the 'pump' drill of the North American Indians, with strings and spindles serving to mechanize the arduous labour of drilling.

The so-called fire-plough method, which is the rubbing of a lengthwise-notched stick with another stick, is customary among the peoples of Borneo, Polynesia, and Micronesia, and is also referred to in the creation myth of the Phœnicians. Other variations of the fire-saw are used by the Malays and by the natives of New Guinea. Even primitive 'lighters' are known, involving the still unchanged operation of creating sparks by striking stone or metal against stone. This practice is customary with the Eskimo because scarcity of dry wood in icebound regions necessitates the use of other materials, and among many South American tribes. More ingenious is the fire-pump of India and Borneo. It consists of a wooden cylinder in which a piece of tinder is compressed with a closely fitting piston which is stroked up and down until sparks are produced.



TINDER BOX, FASHIONED FROM ARMADILLO TAIL
Tapiete and Toba Indians
After Nordenskiöld

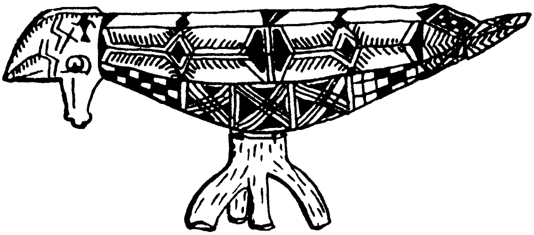
Such primitive methods of producing fire have survived the ages, as our modern Boy Scouts know. Like to-day's primitive peoples, prehistoric man depended upon them. In the ice-age graves of northern Europe pyrites and flint have been found side by side. The Romans discovered the fire-creating qualities of sulphur, and used it in combination with their fire-stones. It was not until about 1650 that chemical lighters, operating on a combination of phosphorus and sulphur, made their first appearance. Almost two hundred years later, around 1820, the first 'phosphoric bottles,' complete with sulphur-treated matches, were sold in London ; S. Jones's 'Lucifer matches' and later improvements quickly followed.



HEAD-REST OF WOOD
Geelvink Bay, New Guinea
After Wood

Next to the sheltering roof, the fire has been since the dawn of time the main element in the conception of 'home.' It gave the human touch to the mere shelter or abode ; it is the mark of *homo sapiens*, however primitive his belongings, because no animal has ever been able to control or maintain this blessed gift. When nostalgia besets us far from home it is the fireplace that we most frequently recall as the symbol of its pleasantest associations.

To primitive man fire may mean the difference between life and death. It is no wonder that he tries to keep fire alive under all circumstances, to have it always available. If it threatens to die out blow-pipes and fire-fans rekindle it in Indian homes; bellows are used in Africa. Even on trips and excursions fire is carried along. The Eastern Bolivian Noeze carry packages of smouldering particles of the *motacu* flower carefully wrapped in moist *pataju* leaves. Many South American tribes maintain regular 'filling stations' containing stores of smouldering tinder under ashes in specially erected rain-protected huts at the cross-roads of jungle paths, so that the passers-by can readily obtain the precious element, which they cannot easily kindle in the humid primeval forest. When Albert Schweitzer told some West African natives about European forest fires they laughed. The woods are wet like sponges—how can they burn?



WOODEN HEAD-REST

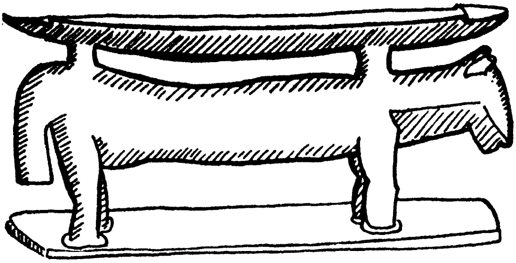
Santa Cruz Islands

After Wood

The fire in the middle of the tent, in the hut, or in the house is the centre of all home life, the source of warmth, the creator of palatable food, the inspiring flame which brings olden tales to life and draws the family circle closer. At night it is the keeper of warmth and the friendly protector against tropical insects.

The roof and the fire are the two fundamental elements in the notion 'home,' but no man has been content throughout time to satisfy only his most fundamental needs. For comfort and for an expression of his individual desires he has devised furnishings for the home.

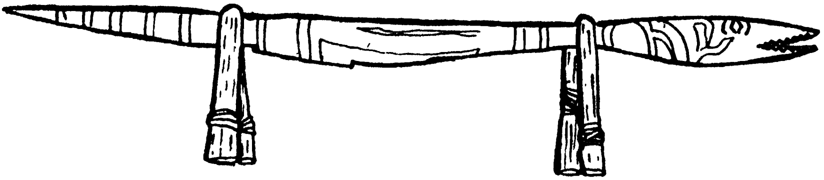
A child of nature sleeps in a way most comfortably suited to the prevailing climate. The earliest bed of man was the simple floor-covering of fresh twigs and branches. Coverings of animal skins are used in Tierra del Fuego and in many North American regions ; the warmer climates of Australia and South Africa allow much scantier coverings or permit people to dispense with them altogether. Sleeping naked in wood ashes is preferred by many African tribes as a healthy practice which protects the body from cold and insects. Most Pacific and Southern Asiatic tribes sleep on neatly woven mats. In Polynesia the number and age of the mats in a household determine the wealth of its owner.



HEAD-REST

Kafirs, South Africa

After Wood



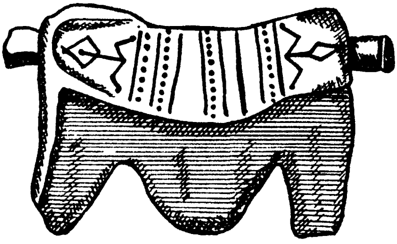
HEAD-REST

Mamberamo, New Guinea

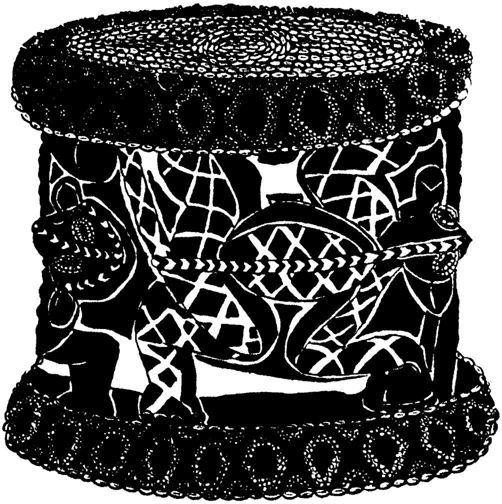
After Wood

The first ' pillow ' is a head-rest which may assume any imaginable shape from a crude log to the artistically carved square bench that supports and protects the complicated native coiffures. In Africa and South America it has developed into a richly carved little stool, a handsome piece of ' interior decoration.'

A regular bed in our sense combines the conception of a resting place with elevations above the floor-level. Such forerunners of the modern bed are the sleeping benches of clay or soil along the inner walls of houses common in West Africa and the Sudan, as well as among the Indians of the American north-west coast. Platform-shaped beds of wood, occasionally covered with very comfortable plaited 'mattresses,' are used by many primitive South American jungle households, and are also common in Africa. They are a very ancient invention, regarded as even older than another famed primitive sleeping device, the hammock, which seamen still recognize as thoroughly practical and comfortable. Hammocks were developed in New Guinea and especially among the South American tribes of the tropical East. Woven of plant fibres, they criss-cross the living-room of the huts " like the liana twists " outdoors in the woods. As a protection against insects, many kinds of primitive mosquito-nets have been invented. Among the Guató Indians



BENCH OF CEDARWOOD
Supposed to represent figure of Jaguar
Guarani Indians, East Paraguay
After P. F. Müller



AFRICAN CHIEFTAIN'S STOOL
Cameroons
Wood carving, decorated with cowrie shells and glass beads
Museum of Ethnology, Cologne

nets have the shape of a wide sack woven of tucum-leaf fibres, and are suspended so that the opening is over the sleeper's face. The Nor-Papua of New Guinea fashion whole sleeping-bags of long *kirấn* grass. These bags are highly desired trade objects among the islanders.

The average primitive household does not include tables and chairs as necessary items of furniture. The family members prefer to sit on mats or animal skins or on the bare soil, occasionally on rocks and logs. Simple stools and benches are found among the aborigines of South America and Africa. The possession of a chair is certainly not regarded as an addition to comfort. When the idea of dignity and the desire to feel superior, even physically, possess the mind, the chair becomes a medium of elevation ; the higher rank of a person is visibly expressed by enthroning him on a magician's or chieftain's stool. This is especially customary in the Dark Continent, where chieftains' stools, painstakingly carved, are among the finest manifestations of African sculptural art. Precious cowrie shells and glass beads are often used to decorate thrones, some of them completely covered with thousands of blue and white glass beads under which the magnificent carvings are completely concealed.

WOODEN BOWL
Santa Cruz Islands
Museum of Ethnology, Cologne

But even without heavy furniture, the primitive home impresses the visitor by its general air of comfort and by the presence of essential things which contribute to the happiness of family life within the general framework of its cultural level. And utility is not the only consideration ; sense of colour and form and good taste characterize the furnishings of even the simplest home, from the ochre-painted wooden containers and handsomely ornamented string bags of the Australians to the beautiful pottery and artistic spoons and ladles of Africa. The magnificently carved bowls and head-rests of the South Seas are some of the proudest possessions of our museums.

The more settled a tribe, the more time can be spent by its members in beautifying the inner and outer walls of houses with painted or carved ornaments. The totem-poles and house fronts of the Alaskans, the African wooden and clay reliefs, and especially the carved panels of Polynesian homes furnish outstanding examples of such peculiar artistic perfection that modern sculptors have often attempted in vain to imitate the workmanship, subtle colouring, and exotic designs of these ornaments.

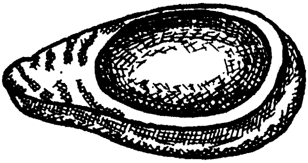
Even the households of prehistoric man were furnished with luxuries, including artistically shaped and ornamented spoons, needles, stone knives, carving tools, drills, spindles, and planes. Neolithic lamps are the prototypes of the oil-lamps of classic Pompeii and Rome. As a purely æsthetic expression, male and female and animal figures were carved or painted on walls during the Aurignacian period ; statuettes of ivory graced some rooms. Besides the earliest manifestations of great religious art preserved in the magic animal paintings of the palæolithic caves of Spain and Southern France, we find equally numerous expressions of early applied art in the ornamented containers, tools, combs, and dishes of millenniums ago. Whole cultural stages of the Neolithic period have been named after the ornamental designs found on the pottery of its artisans.

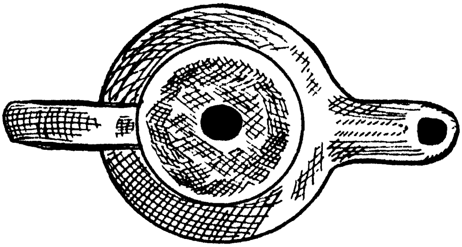
Although not all living tribes have pottery or earthenware in their kitchen corners, because some have not advanced far enough to learn the secrets of their manufacture, all peoples use containers of some kind, whether for gathering, cooking, or storage. The storage of water is most important because it enables a people to move about freely without being bound to a near-by spring or river. But the very primitive have not readily found means of storing water. When, for example, the girls and women of Tierra del Fuego fill their primitive leather bags or bark pails with water, they have to hasten homewards because the containers leak so quickly. The Australians use natural rock pits or hollow stones to store water. The birch-bark containers of the primitive Labrador Indians are much more practical : sewn together and caulked with resin, they are as waterproof as the Labrador canoes which are similarly constructed. While travelling, these Indians use folded water-cups of birch bark held together by wooden pins.

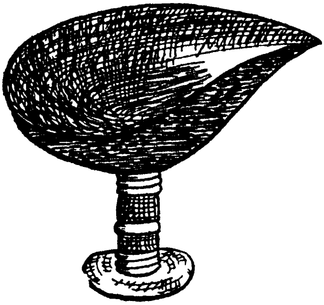
In the Malayan Archipelago hollow sections of cane and bamboo are favourite water-containers. The Indians of Eastern Paraguay store water in pumpkin shells and in the thick sections of the *tacua rusu* bamboo, whose long stems they also use for portable containers by removing the nodes and drilling several drinking-holes into the cane. Parts of the same bamboo serve as very practical kettles which can be used many times before the bottoms become too charred. Coconut or gourd shells are widely used as water-containers also. Another ancient type of water-container is the sewn bag of animal skins found in India and in the Sahara.

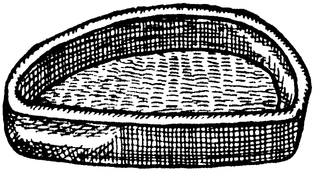
Even the most primitive tribes are very resourceful in devising household containers. For example, the Australians make ornamented wooden bowls and finely woven string bags to hold the

OIL LAMPS







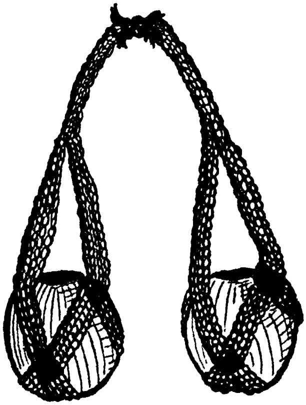


(*Above*) Prehistoric Stone Lamp
Magdalenian epoch
(*Below*) African Lamp
Uganda

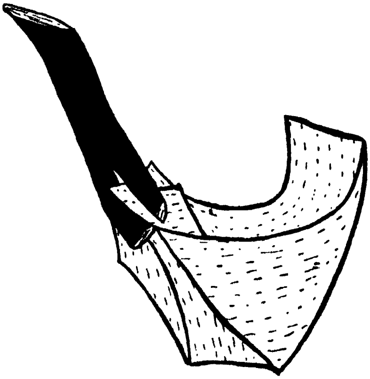
(*Above*) Roman Clay Lamp

(*Below*) Eskimo Stone Lamp

After Haberlandt



WATER-CONTAINER: COCONUTS ON COCONUT STRINGS
Santa Cruz Islands
Museum of Ethnology, Cologne

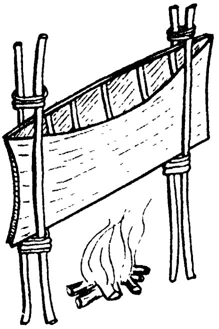


DRINKING CUP, FOLDED FROM BIRCH BARK (TRAVELLING MODEL)
Montagnais-Naskapi Indians
Collection Julius E. Lips

fruits and plants they collect as food. Plates and platters of leaves, shells, or wood can be found wherever a primitive family lives. Ladles, which are older than spoons, are often artfully ornamented and of exquisite shapes.

If we had a magic carpet to carry us safely to the isolated abodes within the hidden corners of the world we should find among primitive households scenes of peaceful comfort.

In the birch-bark or caribou-skin Indian tents which dot the vast hunting-grounds in the interior of Labrador the smoke of the home fire emerges through the smoke hole at the apex of the conical structure. Inside, broth boils in the caribou-belly 'pot,' a beaver-tail roasts on large wooden skewers, and the pemmican mixture of bear grease and preserved blueberries stands ready in a covered container of ornamented birch bark. Round baskets of the same pleasant brown- and white-coloured pattern hold *banok*, the Indian bread. When the wooden spoons are washed and the huskies have retired to beds dug in the snow outside the Naskapi family reclines on the balsam-covered floor near precious bundles of mink and marten, lynx, musk-rat, and silver fox which will be brought down to the Hudson's Bay Company post during the next spring to pay for the following winter's supplies. The fire is carefully tended ; the baby cradle of appliquéd leather swings slowly in the dim light of the northern night ; hunting-charms dangle from the wall ; and the young may dream of the venerable grandfather, the Bear, while their father prays to the Man of the North that he may have mercy and not send a new blizzard to cover the tracks of the game and the trail to the traps.

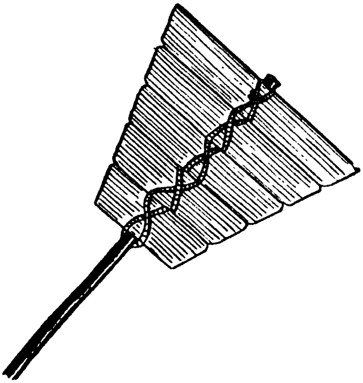

COOKING POT
FROM THE
NICOBAR ISLANDS
Bark
After K. Weule

Farther north, the Eskimos lie down to sleep under a dome of snow. Reindeer, bear, and musk-ox skins neatly cover the snow platform of the beds ; the hunting knives have been cleaned ; the dogs, still munching on bones, lie down in the entrance passage ; the seal-oil glows in the fifty-pound lamp of soap-stone—*Utkusiksaligmiut*—that provides the cooking and the heating warmth, and from which a whole people once took its name.

Peace is in the Indian huts of California. The flaked, smooth-handled stone knife lies in the kitchen corner ; finely woven coiled baskets stand ready for the gathering of the wild acorns ; alongside them are mortars of cotton-wood and pestles of stone and specimens of the crudely coiled pottery preserved from former generations.

In the so-called 'savage' world housing is no problem; rent-demanding landlords and complaints from lodgers are unknown; kindness and gaiety, contentment and mutual assistance govern life in contrast to the painful uncertainties of 'civilized' living. Wherever we pay our visit among the primitives, we find a like nearness to the gods and a like peace of mind.

The homes of the Pañ' and the Chiripá, which lie in the jungles of Eastern Paraguay, present with their one-room combination of parlour, kitchen, and bedroom an equally appealing appearance. Under the great hammock, made of either red-dyed bromelia, cotton, or cocoa fibres, which is reserved for the master of the house, lies the comfortable palm-leaf mat for his wife. Low stools fashioned in animal shapes stand about. The parrot, an indispensable family pet, chatters from his stand. *Typycha*, the broom, is never missing; the pounded earth floors are clean. A practical shelf hangs from the roof to protect food supplies and kitchen tools from ants and dogs. A sharp-bladed knife of *tacuarembo* bark lies ready for the housewife.

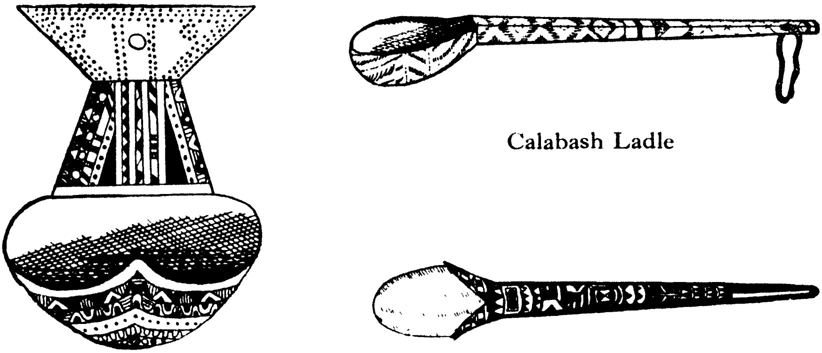


FIRE FAN
Pangwe, West Africa
After G. Tessmann

Greater wealth is found in the typical home of the agricultural regions of Africa, where iron tools, multiformed covered baskets, colourful woven mats, baked pottery, and scores of additional gadgets make up the variety of material possessions.

The community house of the Pangwe is equipped with benches all along its walls. Day and night the fire throws its light on the drums and on the whetstone dangling from the roof and the great hunting net used for the communal battues. Animal skulls, the hunting trophies, decorate the room. The blacksmith's dug-out workshop with his bellows and fire-fan are often part of the equipment of the community house. In the family home three corners are occupied by the sleeping benches, with the fireplace at the narrow side of the room. Shelves for dishes and clothes-dryers are conveniently arranged; boards for drying and roasting peanuts are kept under a large wooden storage box which may be likened to a pantry. The women's long baskets are hung on the walls, and a three-legged round stool waits for the guest of honour. Grinding slabs with pestles, fibre and wooden plates and bowls, ladles of all shapes—different for men and women—calabashes, and brooms complete the equipment of the well-organized home. When festive occasions lure the dancers to the village square torches of raffia produce a strong and romantic light.

PANGWE LADLES
West Africa



Ladle for the Use of Men

Calabash Ladle

Pot Ladle

After G. Tessmann

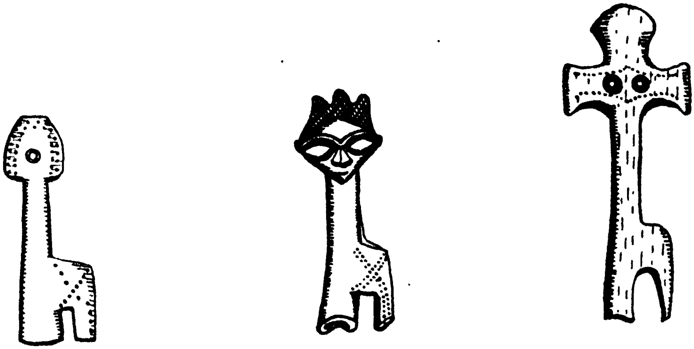
In the beautiful Polynesian homes the harmony of the interior decoration measures up to the splendour of the carved and painted exteriors. On Ponape the spaces between the carved pillars are walled with bamboo sticks so richly corded with multi-coloured cocoa strings that the wood is completely hidden. The black, red, and blue cords form intricate wall patterns, and are trimmed with tassels and shells. Even the bamboo floor over the stone foundation is covered with cocoa cordings. The fireplace is a square in the middle of the room. Sleeping mats, calabashes of polished coconut shells, nut graters, stone mortars and pestles, and many other tools and pieces of household equipment are tastefully arranged. Finely ornamented baskets contain shell knives and tools of coral and fish-skin ; spears, paddles, ornamented clubs, and the women's weaving tools adorn the walls. Not the smallest trace of refuse or dust is tolerated. Exquisite curtains separate the sleeping-quarters from the living-room, and the carved head-rests are of a variety of woods, often with bamboo feet. The exquisitely shaped wooden bowls and dishes are richly decorated, and the soft tapa cloth of curtains and clothing shows hand-painted patterns. Fans and fly-whisks add further touches of luxury.

The homes of the high cultures of the New and the Old Worlds have absorbed, adopted, and transformed most of the possessions and inventions of earlier times. They have improved on them through precise methods of manufacture and professional specialization, which the primitive builder and craftsman could not develop.

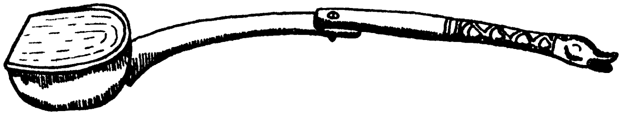
Examples of sheer luxury are found in the remains of homes older than the earliest records of our history. The excavations of prehistoric sites at Abu Shahrein, the old Eridu, brought to light carefully smoothed floors, and doors with hinges fashioned from stones imported from distant regions. Deep cellars and round windows can be traced back to the so-called ' band-ceramic ' period of the Neolithicum. The houses of the oldest Anau culture were built of sun-dried bricks and were also equipped with hinged doors.

Wherever scientists uncover ruins of ancient temples or palaces built at the dawn of history, astounding evidences of supreme luxury are found, examples of a standard of living unknown to modern civilization. In 1946 Russian scientists found in Southern Siberia near the Chinese border the remnants of a Chinese palace constructed before the birth of Christ : it was filled with treasures of overwhelming perfection. The main hall of this palace of Khakassia covers an area of about 140 square yards. Two kinds of tiles cover the roof, on which there are round medallions with Chinese inscriptions. The massive bronze door-handles display horned genii. Clamps, bolts, bronze buckles, golden earrings, and jade saucers were uncovered in the ruins. A furnace with a built-in tubular heating system distributed warmth throughout the building. Modern architects still try in vain to imitate the Roman method of heating the floors of houses from beneath ; equally advanced heating methods have been known in Korea for centuries. The magnificence of the excavations of the Babylonian Ur, to-day El Mukajjar (many of the finest specimens recovered from these sites are exhibited in the British Museum), make our modern artisans wonder whether they will ever be able to reach the perfection attained during the third millennium before Christ.

It is one of the ironies of history that the white man who adopted the ideas of the primitives to adjust them to his needs has often changed them so much that the aborigines of our time have difficulty in recognizing their purpose. When a native of the Belgian Congo heard a white man whistle on a key he mistook the gadget for a musical instrument and carved key-shaped flutes of ivory for his tribesmen, so that they might share the latest European invention. A crude white man's kitchen ladle, mended with an iron screw, impressed another Congo native so profoundly that he carved one for himself just like it but in one piece, with the screw and the mending so neatly imitated that even the lower tip of the screw protruded from the 'mended' part.



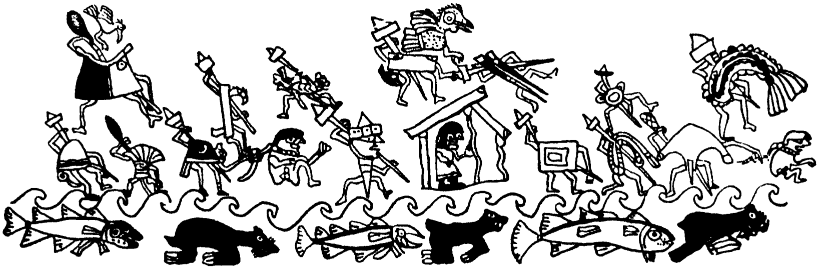
IVORY FLUTES, IMITATING EUROPEAN KEYS
Belgian Congo
Royal Conservatoire of Music, Brussels



ONE-PIECE IMITATION OF A WHITE MAN'S MENDED LADLE
Congo
Museum of Ethnography, Stockholm

When something goes wrong with any of our household tools we tend to act as if the object showed malice. It is by no means a new idea that at times the things created by man to lighten his daily drudgery get out of hand and that he may lose his control over them. Similar was the fear of the sorcerer's apprentice who stammered, " How can I get rid of the spirits I called up myself !" Atomic power, that supreme triumph of modern science which snatched from the Builder of the Universe the secret of His suns and planets, has already reared up so threateningly that the whole world fears the consequences of our enlightenment.

This ancient human fear of the potential dangers of the things made by man himself induced an old Peruvian artist to paint a pictorial story of " The Revolution of the Tools " on a vase of the Protochimú epoch. The lower border of the design, depicting waves and fish and seals, indicates that the rising of the objects against their human exploiters took place at the sea-coast. Only three human figures are shown, two of them prisoners in chains, the third under attack. The rest of the characters are things, led by a cudgel which threatens the man in the centre ; the rebels are belts and head-dresses, slings, catapults, helmets, purses, and pieces of jewellery. Now that their day of revolt against their employers and suppressors has dawned, they are ready to take revenge against his presumptuousness. All this is in accordance with an old Quiche myth which predicts that the day will come when dogs and chickens, pots and pans, and grinding slabs will make man taste the hardships to which he habitually submits them—the slabs will grind their human inventors ; the pots will boil them ; the chicken slaughter them ; the pans will roast them. This has happened before, says the saga, and it will happen again.



"THE REVOLUTION OF THE TOOLS"
From a Clay Vase
Valle de Chicama, Peru
After W. Krickeberg

> Long, long ago the sun disappeared and the world was shrouded in complete darkness for five long days. This was the signal for the things to mobilize. The stones began to grind, the mortars and pestles marched against their masters, and even the llamas attacked their keepers in the stables as well as in the fields.

Look around you, all-knowing *homo-sapiens.* Be kind to the things which serve you. Handle them gently—they might resent rough treatment. Appreciate the never-ceasing readiness of the gadgets you devised to serve you.

CHAPTER TWO

Accessories of Allure

HERE COME THE JEZEBELS ! The preacher of a small New York sect thus greeted the appearance of two visiting ladies who, fond of occasional 'on-the-spot' investigations, had ferreted out his 'church' in the big city's reservoir of human oddities. The worshippers, following with their eyes the accusing finger of their prophet, watched the smartly made-up though utterly discreet intruders blush—it was a most embarrassing situation !

Later this little incident furnished the material for a long discussion, and the question arose : why is it that some people associate the idea of 'sin' with a well-groomed woman ; why do they ascribe low character to a "female who paints her face" ? Is the idea of enhancing artificially the charms of nature really so alien to the 'unspoiled' human mind ?

FAVOURED WIFE OF CONGO RULER

American Museum of Natural History, New York

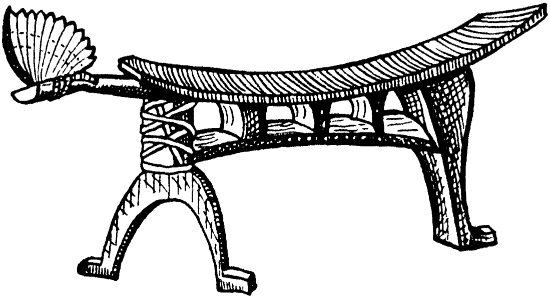
It was not so some ten thousand years ago, and it is not to-day in many sectors of the world where peoples who never heard the term 'cosmetics' still follow the ancient rules of allure for the sake of æsthetic joy and for hygienic and spiritual reasons. When it comes to the display of taste 'savages' have a very definite notion of what they consider attractive and what not, and they miss no opportunity to express their taste freely. Men and women alike take part in the general effort to give to their bodies and their clothing the touch of beauty ; and while man in modern civilization has been forced into a subdued attitude as far as his vanity is concerned, his brethren of the wilderness openly compete with the charms of the fair sex and often even surpass them.

While in Western civilization the variations of taste are extremely numerous, these variations are even more pronounced among the different races and tribes of primitive peoples who set for themselves their own standards of attractiveness and are not easily persuaded to copy their neighbours' fads.

An insight into the prerequisites of attractiveness as conceived by, for instance, the Maori, was furnished by Elsdon Best, who states that, in order to be considered good-looking, a girl has to have " shapely legs with a well-poised body, a comely junction of the trunk with the buttocks, and a straight-legged, erect carriage " ; while male beauty, according to the Maori women, consists of " a stalwart, mature aspect, with well-shaped body, handsome face not too wide, large eyes that look with a mild expression upon man." In addition, such an Adonis must be " kind, with shapely loins." This is not too far from our own, the Greek ideal of beauty. In contrast to this, the Koreans, a high-cultured people, feel differently, especially concerning 'Greek'-shaped faces, and they ran away in horror when the Second World War brought them in contact with their liberators, the American soldiers, who, to them, were " giants with big noses." Many North American Indians, like the Hopi, expect a beautiful girl to whiten her face with corn-meal and to wear her hair in butterfly whorls. There is nothing vague about such conceptions, which all testify to the fact that at all levels of culture man created his own laws of beauty. But beyond such detailed specifications we notice among the children of nature one point on which everybody seems to agree : the fact that cleanliness is the basis of all good looks. There is no well-bred savage who would abuse the iron rules of bodily hygiene. The admonition, " You wash like a white man ! " (who often, while living among 'primitives,' cleans merely his face and hands) is, indeed, one of the worst insults a savage can hurl against any of his tribesmen.

Whoever has lived among primitive tribes will report on their great neatness. O'Connell, who shared the life of the natives of Ponape for a long time, stresses this point by saying that they bathe two or three times a day and that anyone who neglects this healthy custom " loses his social standing. He will be expulsed and left in shame." Equally strict are the Creek Indians in their observance of at least a daily bath in a river (and four rolls in the snow during winter). How strongly this custom prevailed among the Indians was emphasized by the old explorer Adair, who remarks : " The neglect of this bath hath been deemed so heinous a crime, that they have raked the legs and arms of the delinquent with snake's teeth."

Numerous reports and testimonies of explorers emphasize this happy-to-be-clean attitude of savage peoples wherever water is available. But even where water is scarce, as, for instance, in the Sahara Desert, the natives take care of the proper cleansing of their bodies by subjecting themselves to the hygienic effects of the desert sands. In the arctic and subarctic regions of the globe, where an extremely cold climate makes it difficult to clean the body, primitive man invented the steam bath. For this special purpose they construct bath-houses in which stones are first heated and water poured upon them to produce the steam. After reclining in the dense steam the bathers often finish up with a quick jump into the cold running water of their creeks and rivers. Sometimes such a 'Turkish' bath can accommodate many persons, while in other instances small cabins for one or two steam bathers are preferred. Even sick people undergo this cure in the hope of getting rid of their fever, often with the magic assistance of the medicine-man's songs and prayers. The modern Scandinavian sportsmen whose countries have preserved the ancient custom of this type of steam bathing ascribe much of their physical vigour to its beneficial effects.



WORK STOOL FOR COCONUT SCRAPING
With cardium shell used as scraper
Marken Islands
After Parkinson

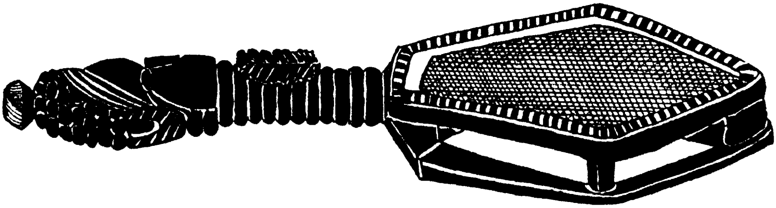
The frequent exposure of the skin to hot steam and cold water and, in tropical climates, to the surging rays of the sun necessitated a regular care of the exposed parts of the human body. Consequently, there is practically no tribe on earth whose members would not make use of fats and oils and greases to smooth, cleanse, and lubricate their skins. The calabash or coconut-shell oil-pot is, therefore, the regular stand-by for both sexes, who rub themselves with 'cold cream' as often as they can. Some African tribes use the oil of the raffia palm-tree exclusively for beauty purposes, since most insects are allergic to it. In the South Seas the most widespread provider of greasy lotions is the cocoa palm, which to-day furnishes the skin preparations of our own fashionable ladies with their most effective ingredient. Ingenious methods are applied by the natives to split and grate the coconut with the help of adequate tools. Some submit the minced substance to a process of fermentation under the sun, by which the oil is segregated and can easily be removed for further use in cosmetic blendings.

Such mixtures, with palm oil, castor oil, lard grease, or even butter as their basic ingredients, may contain redwood, ginger-root, herbs, or metallic powders, most of which have proved their protective qualities not only against sunburn or insect bites but also, as many explorers indicate, against the influences of cold weather and rough winds. These pastes may cover parts of the skin or even the entire body, and it has been reliably reported that this original protection of the skin of many tribes has been far more beneficial to the health of its users than the cheap cotton garments which were later forced upon the natives by shrewd 'civilised' merchants.

The mixture of colour and greases to produce a cosmetic and hygenic stand-by is very widespread, especially among Australian and African tribes, who enjoy its double function as a remedy and as a decorative medium.

Colour plus grease? Well, isn't this the correct description also of all the grease paints found in our own boudoirs and our theatrical dressing-rooms? Indeed, this brings us right back to 'the Jezebels.' The art of 'making up' with grease paint can by no means be attributed to 'modern decadence' or to the frivolous whims of the moment. Long before any records of written history were started men and women alike were conscious of the attractiveness of selected colours blended with the human skin; and they knew how to find, to recognize, and to prepare them for their own use as cosmetic aids. Even the very strict territorial laws of certain tribes who allow no trespassing include occasionally one concession: that neighbouring or even foreign tribes may cross the protected tribal land on their excursions to obtain the 'vital' colours which may be found only at one or more far-away places.

The cave-man and his cave-woman went out in search of these colours, as remains of ice-age colour mines prove. They had their own formulas for the blending of the colours with different greasy substances for their 'dressing-table,' exactly as do to-day's children of the wilderness. The discoveries of the palæolithic sites have preserved these cosmetic colours of the ice age, ready-mixed in ornamented bone or slate containers, with palettes and pestles for their handling. Practically all former homesteads of palæolithic man show abundant supplies of these cosmetics ; and even the dead in their graves were provided with generous quantities of grease-blended colours, to be taken along on the long journey to the land of the departed. In later periods of human history, from the Neolithic Age on, these evidences of early vanity became extremely numerous ; and more surprising even than their abundance is the variety of shades. Manuel Déchelette's analyses of the prehistoric deposits reveal seventeen different colours, with white (marly limestone), black (charcoal and manganese ores), and the ochre scale, from red and orange to the lightest yellow, as the favourites.



PALETTE FOR PREPARATION OF GREASE PAINT
West African
Museum of Ethnology, Cologne

These colours and their raw materials correspond exactly to those used in many primitive cultures of our days. The beautifully carved masks of the Gazelle Peninsula and other Melanesian regions show predominantly the three colours of red, white, and black, with some occasional touches of blue and green obtained from vegetal substances. Other shadings and mixtures have been added by other tribes, but all attribute special significance or give definite preference to one colour or the other.

However, the specific symbolic significance attributed by us to certain colours may have entirely different meaning to primitive peoples. Thus, white is, to the Pangwe, by no means the colour of purity but, on the contrary, the colour of evil, as evidenced by its importance in the ' bad ' lunar rites ; but at the same time it is regarded as a most beautiful colour. It is followed in preference by black, " the colour of the night and of all that is disagreeable, frightening, and horrible," while the joyous red symbolizes all the good things of life. These tribes also distinguish lilac as the colour of the dead ; all plants with lavender blooms contain the word *kun* or *bokun* (soul) in their native names ; and the bluish shadows of the trees mark them as the favourite abode of the departed. Beauty is often identified with the ' demonic ' white. They show no admiration for the plumage of their magnificently multicoloured birds, but the plain white heron, *Bubulcus ibis*, excites them by its " overwhelming beauty." In contrast to this, the sombre black is, to the Atxuabo of Portuguese East Africa, " the colour of joy."

Often the vocabularies of primitive peoples show, by their terms for colours, the variety of shades they distinguish. The Chama of eastern Peru know yellow, ' blue-and-green ' (one word), purple, and ' banana-orange ' ; while the Sipáia Indians have individual expressions for red, yellow, orange, dark blue to dark green, light blue and light green, brown, grey, black, and white.

The habit of attributing symbolic meanings to certain colours has entered the religious and profane conceptions of all high cultures, including our own. In the ancient Aztec codices the four quarters of the globe were indicated by individual colours, with red for the East, blue for the West, yellow for the North, and green for the South ; while ancient Chinese and Iranians assigned blue to the East, red to the South, white to the West, and black to the North. The demons in the Lama temples of Tibet are always red ; most of the Tibetan gods sit on red lotus lilies, with the white flower reserved for Chanrasig, the highest *Boddhisatva*, and the blue for Tara, the ' madonna ' of Lamaism. Even each element has there its own symbolic colour : wood is green, fire is red, the earth is yellow, iron is white, and the water is blue. Every syllable of their famed prayer, the OM MANI PADME HUM (" O you jewel in the lotus, amen ! "), has its own colouring. OM, symbolizing the skies, is white ; MA, symbolizing the word of the *asuras*, is blue ; NI, symbolizing the world of man, is yellow ; PAD, symbolizing the animal world, is green ; ME, symbolizing the world of the pretas, is red ; with the concluding holy HUM, which bars the gates to the hells, conceived as black.

Numerous are the analogies in other high cultures like Egypt, India, and China. The same applies to the colour symbolism of our Christian ritual with the holiday or mourning decoration of the churches in red, white, green, purple, black, etc., and the carefully prescribed colourful regalia of the members of the Catholic clergy. And even in our daily figures of speech we use colour symbolisms, although of different content, when we speak of ' the green-eyed monster,' ' a blue Monday,' ' the reds,' or ' clad in the colour of innocence,' while our governments publish ' blue books,' ' white papers,' and ' black lists.'

The spectrum of primitive man is, as we saw, not so manifold, but he certainly knows how to make the most of his favourite colours. It was reported in early times the American Indians painted their skins red, and consequently they were called 'redskins' by the old pale-faces. This custom often included even babies and infants. Red and black minerals used for the pigments were often carried about in small painted deerskin pouches. The Nor-Papua of New Guinea cherish the red *kekevak* colour, which they burn and mix with coconut oil to use always on their bodies. For face, arms, and legs they prefer a yellow earth from the Sepik; for breast and thighs a white colour, which they gain from near a sulphur spring, is fashionable.

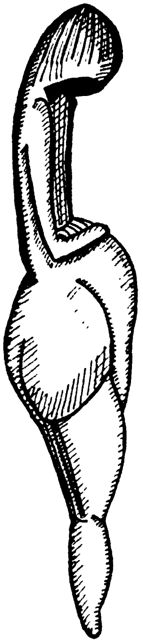
Tradition may prescribe different colour fashions for the two sexes, and even different ways of applying the paint. This is the case among the Miskito and Sumu Indians of the Atlantic side of Honduras and Nicaragua, whose women choose for their fancy patterns paint from the red seeds of *Bixa orellana L.*, a shrub or small tree, while the men do not bother with intricate designs but simply cover all exposed parts of their physique with a black melted gum over which they apply a coat of turpentine. Red is also the favourite colour of the eastern Bolivian Tirinié women who paint their entire faces, with the exception of nose and eyelids, with vivid *urucu*, which the Neoze women of the same region merely use on cheeks and forehead. The Papagonians mix their black, red, and white earth colours with marrow and apply them thickly to their bodies 'as a protection from the surging wind'; and the South African Bantu, like many Australian aborigines, use fat salves mixed with ochre. African shepherd peoples often use cow droppings or even the urine of cows as a blending material for their paints; their belief in the hygienic qualities of the latter goes so far that many of them hurry to wash their hands in the warm jet when it appears under a cow, and insist on using it as an eyewash.

Again and again we find an ardent preference for red, manifold as its raw materials may be. The Montagnais-Naskapi Indians, who refrain from using this beloved shade on their skin, nevertheless declared during my visit in Labrador that no colour on earth could be compared with the magnificence of red, which they mine as vermilion for the decoration of their tools, canoes and clothing.

Many high cultures have maintained this ancient preference. The Hindu women of to-day still dot their foreheads with red ***kum kum*** powder, and the Mohammedan world depends largely on the use of *Lawsonia inermis*, the leaves and stems of the henna shrub, to achieve red colour accents as an expression of good grooming, beauty, and happiness.

That allegedly very modern accessory of allure—the lipstick, which also is red—actually dates back to the ice age. Specimens of 'convenient size' and pointed at the top have been found in many prehistoric caves. For countless ages lipsticks have served to deepen the colour of women's 'rose lips.'

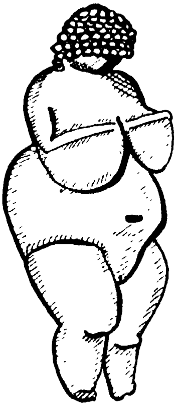
PREHISTORIC ALLURE



Palæolithic Figure from the Grottoes of Lespugue, Haute Garonne, France

After Le Comte de St Périer

Dancing Women
Rock Painting from Cogul, Spain



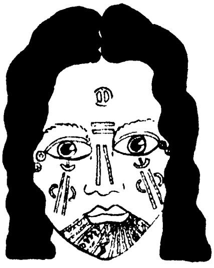
The "Venus of Willendorf"

Ice-age Figure of Carved Limestone

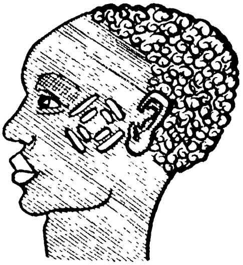
Naturhistorisches Staatsmuseum, Vienna

From the earliest times geometrical patterns served to accentuate even more the favourite colours and the taste of their wearers.

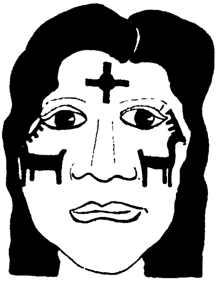
Such painted designs may or may not indicate special qualities like membership in a particular tribe, the coming of age, social standing, bravery, and the like. Even the bones of the dead are occasionally exhumed and decorated with intricate ornamentations, and many uncovered prehistoric manifestations of plastic art, like, for instance, the famed " Venus of Willendorf," still show signs of painted patterns in red. That this habit prevailed also during classic times is evidenced by the ornamented arms of the Phrygian woman with child on a vase in the British Museum and by the report of Ammianus Mercellinus (A.D. 330–400) on the Agathyrsians, who painted body and hair in blue.



TATTOOED CHOROTI GIRL
Gran Chaco
After R. Karsten



SCAR-TATTOO
Yao, East Africa
After K. Weule

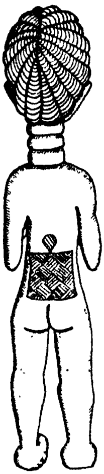


FACIAL PAINTING
Thompson Indians
After J. A. Teit

The striking effect of painted patterns on the human skin inspired the idea of frightening the enemy with this ' psychological ' weapon. Cæsar was duly impressed by the blue war paint of the Britannians, which gave them a ' horrible ' appearance (" Omnes vero se Britanni vitro inficiunt, quod cæruleum efficit colorem, atque hoc horribiliores sunt in pugna aspectu ") *;* and Tacitus saw " ghost armies " of painted Germanic Harians, whose later successors were the modern black-faced commandos of the Second World War.

Paint and pattern may, among primitive tribes, occasionally be outlined by additional glued-on materials which, following the principal design, give it a more plastic appearance. The Central and Northern Australian natives add such touches in white feather-down to the red and black circular symbols of their skin paint to achieve a highly original effect. Certain North American Indian bands use corn meal and seeds for similar adornments.

The desire to give a more lasting quality to the fully applied patterns in a fanciful manner led to the invention of clay stamps or *pintaderas*, as the Aztecs called them, with whose help a fixed pattern could be printed on the desired spot. These, too, were known already during the ice age. To-day the Gran Chaco tribes use them; so do the Dayak of Borneo, who stamp their favourite ornaments on their skins and sometimes use the pattern thus acquired as an outline for their tattoos.



WEST AFRICAN HAIR-STYLE AND TATTOO

Wood Carving

Museum of Ethnology, Cologne

The painted pattern, however, washed off easily and faded. This disadvantage inspired the birth of another idea: to find a means of making the chosen design permanent. The result was the tattoo—a custom of world-wide distribution. Colour is not always added to emphasize the incisions and punctuations that make the pattern; if none is used we speak of a "scar tattoo" of the type used in the old Tasmanian culture. To-day its application is most frequent in another part of the world, the African continent.

Both sexes of the Banda—a Ubangi band—prefer symmetrically arranged incisions in the skin of breast, abdomen, back, and arms. The Pangwe outline with soot the desired pattern on their skins, sculpture it with a knife, and rub the wounds with burnt resin, thus decorating their entire bodies with 'lovely' scars. This beautification is considered indecent on the upper thighs, and the Jaunde women who cannot refrain from decorating these, too, are considered of low morals. The natives of Khartoum tattoo their small babies with the tribal crest by incising the identification ornament in their cheeks. The wounds are rubbed with a mixture of saltpetre, ashes, and selected herbs. After a few days the incisions swell to coil shape and remain as broad scars, the characteristic mark of the Sudanese.

The scar tattoo may or may not be used in combination with the tattooed colour ornament. On account of its more delicate execution the latter allows finer lines, more intricate designs, and a more precise and symmetrical arrangement. The best results in this respect have been reached by the natives of the South Seas and, among them, especially the Maori of New Zealand, whose magnificent spiral ornaments give permanent attractiveness even to the artistically preserved and reverently worshipped heads of their dead. The carved figures in which the Maori culture is so rich commemorate these characteristic tattoos, sometimes in huge dimensions and all over their unclad bodies. Even a Madonna carved by baptized Maori for their church shows these ancient patterns all over her unclothed body. This typical Maori tattoo, which expresses social rank and membership in a band thereby specified, is an object of sincere pride even to the oldest dignitaries, who see their own individualities thus expressed and glorified. The experience of a white artist has shown that even the most realistic portrait of a Maori chieftain was sneered at by its model who, with a superior attitude, drew his facial tattoo pattern in the sand to explain to the white man : " This is what I am. What you have drawn there is of no meaning."

The British sailor O'Connell, who became the son-in-law of a Ponape chieftain, had to undergo upon his acceptance into the noble family the painful procedure of having his entire body richly tattooed with fancy ornaments, which he later learned to identify as the names of the departed chieftains and nobles of the tribe. For a whole week two female artists handled the thorn-studded tattoo boards, hitting him neatly at the previously outlined spots and nursing his wounds with coal and oil.

Many North American Indian tribes also indulged in the adorning art of tattooing, be it for women alone as with the Tübatulabal and Kamia, or for both sexes, as in south-east Alaska.

This custom has infiltrated the high cultures. The vertical lines marking chests and brows on the ancient figures on the bronze plates of Benin are tattoos. The invaders of modern Japan were stunned by the sight of the bodies of men and women who were completely covered with tattooed images of gods and men, quotations from the classics, scenes from plays, flowers, and animals. In our Western civilization the tattoo has lost its original social and artistic significance and has been degraded to vulgarity, to be used merely by adventurous sea-dogs, show people, and criminals.

The more parts of the body these ' artistic ' painting and tattooing operations involve, the more it becomes necessary to remove the body hair. Many tribes adhere, in addition, to the æsthetic conception that a complete depilation of all but the hair of the head is a ' must ' for a well-bred person. Consequently we find a great variety of methods of getting rid of unwanted hair, which may be plucked out with shells (" quick as with a Christmas goose," says O'Connell), or with the help of wooden sticks, with metal pincers, or simply with the finger-nails. This custom has become part of the Hindu and Mohammedan religious requirements.

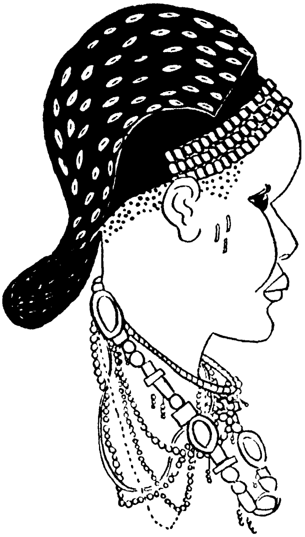
Even facial hair may be considered objectionable. Indians often consider any trace of beard as distasteful, and check its growth by rubbing their chins with wood ashes. Since nature has made the whole race nearly beardless anyway many tribes just remove their eyebrows, hair by hair, to make their faces 'clean.' The plucking or shaving of the hair-line to achieve the effect of a higher forehead is practised by Papuas and Indians, and is also known in Africa.

The regard of the beard as an asset or an obstacle to male handsomeness and the change of beard fashions through the ages belong to the most fascinating chapters of cultural history. When we consider the fact that modern historical study divides beards into fifteen standard types we can well imagine the multitude of pre-civilized forms with all their side-line ramifications. From the full beard of the Australians, the corkscrew goatee of many Papuas, and the 'Assyrian' African forms to the 'naked' faces of the Indians there is an immense multitude of varieties. As for civilized man, the archæological facts seem to prove that the oldest fashions of classical times favoured the clean-shaven face.

The earliest evidence of antique beards appears, according to Mötefindt, towards the end of the Cretan-Mycenæan period. The most interesting form of beard is the semicircular fringe which frames the otherwise clean-shaven face. It is the 'classical' beard which we know from the geometrical vases of the Athenian cemetery of the post-Mycenæan period and from the seventh-century bronze relief of Olympia. It appears also on the reliefs of the temple of Assos, and is worn by Zeus and his adorants (Acropolis of Athens). How persistently this fashion survived through the centuries is evidenced by a miniature of King Edgar of England, dated A.D. 966, which shows him sporting the fringe beard. Exactly the same type of beard is worn by to-day's natives of southern Arabia, the Somali coast, the Singhalese of Ceylon, and in eleven regions of Oceania. Representations of the Aztec gods, Quezalcoatl and Tecciztecatl, show them with the shaven upper lip and this age-old fringe around their chins. In the cultural region of the Mediterranean, from about A.D. 500 on, this was supplemented by the fashion of the full beard, which replaced it almost completely about one hundred years later.

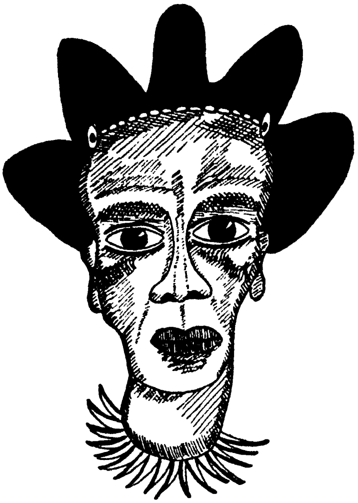
Mötefindt, who has given much thought to this attribute of masculine attractiveness, distinguishes three clearly defined phases of this fashion—the first and oldest when the fringe-beard was the characteristic feature of one Semitic tribe. As soon as the peoples of the Near East came into contact with the Semitic culture this type of beard became fashionable among them. The second phase was entered one thousand years later, when the fringe was no longer restricted to Semitic tribes but had become common among all peoples of the Near East. The Egyptians of the eighteenth and nineteenth dynasties identified any man with this type of beard as a native of the Near East. Only during the third phase did it appear detached from any ethnic group, freely following the fads of fashion. It is still found to-day not only among many tribes ot primitive cultures but also among European fishermen and peasants.

There exists hardly one single element among the accessories of human allure which cannot be traced back to the dawn of culture ; and many of the fashions which we favour to-day throw light upon our state of mind which in some way or other is spiritually connected with these expressions of our external appearance. This is especially true of feminine hairstyles. Legion indeed are the shapes of coiffures preferred by the different peoples through the ages of unwritten and of written history, and when a new fad makes its triumphant debut the historically schooled student of the attributes of human vanity can in many cases interpret it as the evidence of a cultural change as well.


WEST AFRICAN 'HELMET' COIFFURE
After Kromer

No need to say that climate and form of economic living conditions play a decisive rôle in these changes. An elaborate coiffure requires time and a tendency toward complacency, as are provided by the agricultural form of economics, while hunters and food gatherers, with their unstable form of existence, can hardly afford to waste many hours on a complicated arrangement of their hair. Although we can roughly distinguish between three principal types of hair : short and kinky (Pygmies and Negroid races) ; wavy and of medium length (Australians, Veddas, and whites), straight and long (Mongolian races), these technical distinctions are so general that they cannot do justice to the multitude of actual varieties.

A better general picture is provided when we consider the cultural age of the different ethnic groups. Among the Australians, who can be considered very close to the cradle of earliest mankind, we find hardly any artistic hair-styles. If we look for the extraordinary, we have to visit the agricultural tribes of West Africa. Compared with their coiffures, the hair fashions at the court of Marie Antoinette can be called drab and unimaginative. Among them, a respectable coiffure is a masterpiece of sculpture, built to last for months and moulded with the aid of clay, animal fat, and similar ingredients. Glass beads, cowrie shells, brass ornaments, buttons, and feathers provide the last touch to these monuments, which are often held in place by structures of leaf ribs, palm marrow, moss coils, etc. The resulting masterpieces, whose completion may take months, are so artful that they give the impression of a sturdy hat or helmet, which they sometimes actually are. Often their hair fashions are depicted on specimens of their plastic art long after the fashions themselves have changed and even after a tribe has been extinguished. This provides the white student with a history of the coiffures of West Africa, helping him in the dating of a work of art. Men and women of these peoples sometimes prefer artful wigs to the real thing ; these wigs being so exquisitely sculptured and so firmly glued to the head that only a very close inspection can reveal the difference. Tessmann counted in one tribe twenty-five different types of hair-styles and wigs, all distinguished by individual names. The Mangbetu of the northern Congo have a special fondness for long, narrow hindheads (a shape artificially created by deformations of the skull from early childhood on) ; and they accentuate even more this effect of their oblong head shapes by hair-styles of a swept-back type.

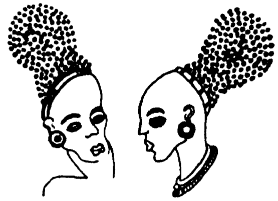


CAMEROONS COIFFURE
Sculptured with cow droppings
After H. Plischke

Many Papua men build their coiffures with equal over-emphasis on 'architectonic' quaintness, but since these hair-styles often have another task, namely to support the gigantic masks worn during their sacred dances, vanity alone would not be a proper explanation of this custom. Strangely enough, their women and children often cut their hair short and leave it to the men to wear, in the true sense of the word, their burden. The Polynesian hair-styles are, in general, much simpler, and mostly feature merely a small chignon. The reason is that these people are so fond of their art of tattooing that they even shave parts of their hair to furnish further opportunities for the application of their favourite adornment.

Many Indians of North and South America cut their hair fairly short, with occasional bangs over their foreheads. Some tribes, like the Apache, feature rolls and coils or broad locks in the centre of the head, while the Eskimo, who like to wear their straight tresses in simple open fashion, use an occasional chignon.

As we see from these examples, our modern civilization has taken over almost all hair-styles of former times during the different waves of fashion, with the exception of certain exaggerated West African styles. In the other high cultures the rigid religious laws have often stopped the acceptance of a fashion, as, for instance, the short bob, which is taboo among Mohammedan women and will never be accepted by Hindu beauties, to whom cut hair is the outer mark of the sorrowful state of widowhood.



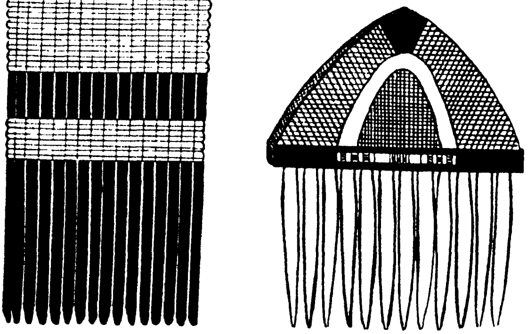
HAIR-STYLE OF MARRIED ZULU WOMEN

After Carl von Hoffman

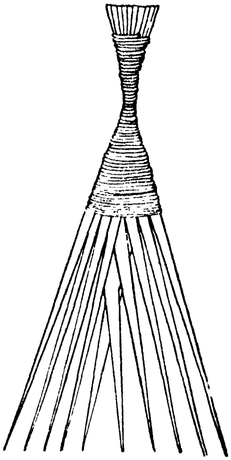
When our ladies go to the beauty parlour to get a henna rinse they by no means benefit by an invention of modern sophistication, because the art of dyeing one's hair is as old as mankind itself. The custom among the North American Kamia Indians of deepening the black colour of their hair by rinsing it in " a boiled decoction of black gum from the bark of the mesquite tree " is an isolated instance, because the desire to bleach or lighten the hair colour is much more prevalent. Many Polynesian tribes bleach their frizzy hair with the help of lye or lime, which results in a reddish or yellowish effect. Not satisfied with this, they add a powder of ochreous earth to their coiffure, which contrasts strangely with their deep brown skins. This practice is so common that the explorer Ross states surprisedly that the Mount Hagen tribes of New Guinea " never bleach or colour " their hair. The British scientist Balfour builds an interesting theory on the habit of the Solomon Islanders of dyeing their hair red with ochre. Explaining the huge red cylinders of stone which crown the mystical colossal statues of Easter Island as sculptured ' red hair,' he tries to clear up the much-discussed question of the origin of the extinct original population whose members came, as he claims, from the Solomons to build on

Easter Island those gigantic monoliths in their own image, with an accent on the ruddy colour of their bleached hair.

That this world-wide grooming of the human hair necessitated the invention of convenient gadgets to comb or brush it is obvious. Bone combs have been found in the palæolithic graves, and even the very primitive Fuegians use combs fashioned of toothed jawbones of the dolphin. The shapes of fibre brushes and wooden and bamboo combs used by other primitive tribes are myriad. The most popular form is a flat bundle of wood or bamboo splinters or wisps of stiff grass, bound together to form a convenient handle. Hairpins in the most varied shapes were known in all ages.



WEST AFRICAN COMBS
After G. Tessmann



POLYNESIAN COMB
Samoa
Museum of Ethnology, Cologne

The desire and the possibilities of shampooing one's hair are, naturally, dependent upon the permanence of the coiffure and the beauty aids available. Water-loving people like the Polynesians wash their hair frequently while swimming. Many American Indians preferred regular shampoos with yucca decoctions or similar plant products. The African coiffures are not so suited for this type of cleansing treatment. But the continuous greasing of the hair, the occasional addition of clay, and the usage of such 'lotions' as cow urine are effective remedies against dirt and unpleasant little insects.

One might assume that the great accent on a perfect appearance of the 'crowning glory' might have promoted the early invention of equally fancy bonnets or 'picture hats.' This, however, is not the case. Despite the rays of the tropical sun, most primitive tribes do not feel the need for hats, and where they appear they have a social or magic significance which is not proportionate to their utility value. The elaborate head-coverings of many African chieftains are plainly tokens of dignity (like, by the way, the parasol, which among primitives is a sign of nobility or chieftainship). This conception has lingered on to this day, from the rank-proclaiming hats of the Chinese bureaucracy to the caps of certain military and naval officers with the amount of gold braid increasing with the rank. The birettas and tiaras of the Catholic clergy are another example.

In cold climates, where the temperature forces the wearing of caps, parkas, and the like, head-coverings are of simple utilitarian shapes ; but to the man of the tropics a hat is the forerunner of a crown. One of the great 'magical' possessions of the white invader in Africa was his hat or helmet, which symbolized to the natives his position as a ruler.

MAN'S CONICAL CAP, 'DIBA'
Affixed to the hair by glue
Kabiri, Papua, New Guinea
After A. H. Haddon

Among some tribes, especially of the South Seas, a hat is bestowed upon the young boy when he comes of age as a symbol of the manhood which he has to earn under hard tests of his courage. The Kabiri of New Guinea call this hat a *diba*. It is of conical shape, covered with lime and decorated with feathers or flowers. The men glue it to the head and do not remove it even during sleep. The Mount Hagen tribes, also of New Guinea, allow their young men to wear a hat " as soon as a beard appears on their chin " —they call it *woinia* or *kan ku*. The men of a neighbouring tribe, the Murik, are entitled to wear a hat only after their initiation ; O'Connell saw this in Ponape. There are similar parallels in an entirely different part of the globe : among the Indians of the north-west coast of Alaska, where such a hat was known as a " cloud hat."

This strange, conical head-covering has played a mystical rôle throughout the ages. At some point it seems to have lost its meaning of rank and dignity and to have acquired a sombre or demonic significance : it became the magician's hat of the Middle Ages, the mark of witches and evil ghosts. In the eleventh century its wear was decreed as obligatory to the Jews of Europe, the prescribed colour being yellow, and Saxon coins of the year 1444 (the so-called 'Jew pennies') show a bearded man wearing such a hat. Le Sage lets his Gil Blas witness a public burning at Toledo of the victims of the Spanish Inquisition who wore "so-called carochas, *i.e.*, conical-shaped high hats of cardboard, covered with the painting of flames and demonic figures." This ancient hat is still to-day the trade-mark of Halloween witches and circus magicians, and has reached its lowest degree of dignity in the 'dunce hats' worn in shame by unruly schoolchildren. Its long and colourful history is another proof of the fact that the tracing of the origin of ancient things often leads to fascinating revelations.

The differences in the opinions of different peoples about the same object are always interesting ; and the heterogeneous tastes are often amazing. Take, for instance, our belief that white teeth are an asset to attractiveness. Not all peoples think so. But whatever their æsthetic ideal, there is no tribe whose members do not try to reach it.

Closest to our own ideas comes the desire to have white, clean teeth. The Nuer use ashes and cow drops in their daily efforts to achieve this desirable whiteness. The Pangwe are so fond of their teeth that they carry their tooth-brushes around in the shape of brass-trimmed walking-sticks whose upper end is split into many bristle-like spikes. Whenever the contemplative stroller feels the urge, he stops to give his teeth the 'once-over.'

In complete contrast to this, the Dusun (Borneo) ideal of an alluring mouth must display black teeth. The skilful method applied to reach this goal has been described by the explorer Staal, who stresses the fact that the dyeing procedure is so sacred that it may take place only before the great devils' feast of Meginakan. Here follows the recipe : "Quava leaves are pounded and mixed with ashes of some wood (*gombah*), and the mixture smeared on the teeth. A strip of banana leaf is folded and laid on the teeth and pressed down to prevent the 'paint' from being soaked off. . . . They keep this on for about forty hours. Then the skin of a creeper (*timbahung*) is pounded and mixed with lime ; the banana bandage is taken away and this new mixture rubbed on. When dry they keep black." These people also like to 'behead' their teeth by filing them down with a rough stone. Despite this practice they never suffer from toothache, the same author affirms.

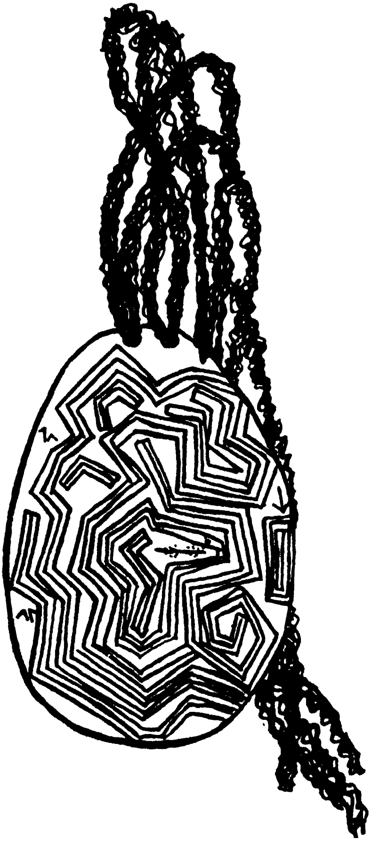
" Though the dental lies bare and remains to rot . . . all chew the *sirih*, and this is clearly a preventive of toothache."

This habit is one of the many forms of tooth mutilations practised for various reasons by many primitive tribes. Often it is part of the initiation ceremonies and kindred to the conception of the dying moon. It may mark the fact that a person has come of age. Some tribes, like the Nuer, who break their six- to seven-year-olds' lower incisors, explain this with the remark : " We do this to demonstrate by it the difference between man and beast." Some merely file the front teeth into fancy spikes, which necessitates the use of a chisel. Among the south-east Australian Yuin this ritual of chiselling off part of their young men's teeth is performed by a mystically garbed old member of the tribe who is supposed to be the Supreme Being ; and when he begins to use his wooden chisel none of his young victims dares to betray the slightest sign of pain. Tessman describes the tooth beautification method of the Pangwe : " The patient, lying on his back, bites firmly into a wooden spool. The dental artist sets a small iron chisel on the tooth and, using a piece of wood for a hammer, hits off the undesired parts splinter by splinter." Other original reasons are given for this custom, as by the Akamba, who told Lindblom ; " We deform our teeth because this enables us to spit nicely [artistically]." A West Afrcian Machako man told him a little story which the Swedish scientist wrote down just as he heard it :

> Some girls went away to get their teeth chipped. They were chipped. And one girl had six teeth chipped and two taken out. And the girls were three in number, and one of them had got her teeth chipped very beautifully. Then they said : " Let us see who has been chipped best and who has got her teeth best taken out ! " They said : " Let us spit ! " They spat. The one that had her teeth well chipped spat much farther than the rest. Then they became excited with envy, and threw her in the water, and she died.
>
> The story is finished.

Another odd dental mutilation is the incrustation of the teeth with precious stones and metals, mostly practised by peoples who belong to the high cultures. The Dayak and Batak drill holes into their front teeth, and close them again with small disks of brass, gold, or mother-of-pearl. The Maya of Yucatan used gold or precious stones in a similar way ; and the natives of Ecuador and India of to-day boast of the same fashion. But whatever the final effect, this type of beautification is nevertheless a mutilation.

However, dental mutilations are by no means the strangest. Best known perhaps is the custom of many primitives of piercing the septum of their noses for reasons of vanity. First a leaf of grass is introduced, to be later replaced by thicker and larger objects, until feather-quills, bones, wooden or metallic objects can be introduced into the hole, to the wearer's joy. Many Australians sport this fashion, but the Polynesian Maori allow such distinction only to their noble families, and make a whole ceremony of the occasion when one of their infants gets its nose pierced, in olden times preferably with the pointed bone of an enemy. The Nor-Papua pierce, in addition to the septum of the nose, its right side and fill the holes with fancy decorations. This custom has been copied in the Hindu high culture, although golden rings decorated with jewels have replaced the old islanders' pig's teeth and bamboo sticks. The Papua of Murik go even further: they pierce their



(*Left*) SHELL ORNAMENT WITH ENGRAVINGS INFILLED WITH RED OCHRE

Wyndham, North-west Australia

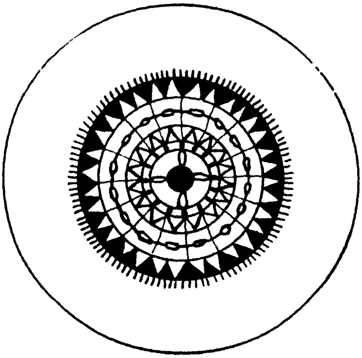
After F. D. McCarthy

(*Below*) CHEST ORNAMENT FOR MEN

Tortoise shell on shell

New Ireland

Museum of Ethnology, Cologne



ears also and like to punctuate their eyes with a small sharp stick, ‘ painting ’ a circle of black dots around the iris.

Among the strangest types of allure are the wooden or ivory disks worn in the pierced upper or lower lips or in both, and also often in the drawn-out holes of the ear-lobes. The Alaskan Indians sport such wooden disks or *labrets* in the centre of their lower lips. This custom has surpassed any imagination in West Africa, especially in the region of Lake Chad, where the wooden disks worn in feminine lips reach the size of saucers. (No wonder the art of kissing is unknown to these fashionable ladies !) Ear piercings can also end in horrifying deformations, with the rubberband-like lobes being dragged down by heavy wooden logs. Our modern ear ornaments bear just a faint resemblance to this stage of their former development.

The pink to purple nail enamels of our modern ladies are no sign of modern sophistication. Many children of nature file their nails on rocks and pieces of slate and colour them afterwards in lavish shades of red. Prehistoric mummies in the British Museum still show this mark of vanity, which later was so highly perfected in China and Egypt.

But what would all these beautifications of the body itself mean if their general effect were not enhanced by the multitude of necklaces, bracelets, arm-rings, and feather crests which men and women have added to their other accessories of physical allure ! From the modest sinew with its bird-bone ‘ beads ’ and shells, as worn by the Selk’nam of Tierra del Fuego, the cockatoo crests and paradise-birds’ tails in the hair of the Polynesians, and the heavy brass shields and collars of the African tribes, what wealth of never-ending ideas we find to make nature serve man’s (and woman’s !) vanity !

There is hardly anything in nature which has not been made use of to decorate the human body and to demonstrate the taste and the wealth of its bearer. Boar’s fangs, bat’s teeth, egg-shell disks, snake bones, snails, berry clusters, seed ornaments, toucan beaks, ivory-tusk fragments, tortoise-shell pendants, forged rings of iron, silver, and gold, are just a few examples. But here, again, the choice of ornaments and materials gives away the religious and magic affiliations of their owner : among the moon-worshipping mother-right peoples we will find characteristic oval crescents of mother-of-pearl, tortoise-shell, and metals, which symbolize the shape of the nocturnal light—forms that still play so dominating a rôle in the Mohammedan world—while the disciples of the sun, the roaming father-right peoples, prefer the circular disk, which they display in magnificent variations of exquisitely inlaid or carved specimens.

Boundless as this wealth of materials is, certain singular materials among them enjoy a special world-wide popularity. Among them is the cowrie shell, which has monetary value as well. It is worn on arms and necks and in coiffures from Australia to the innermost parts of Africa. A close second place is occupied by the tiny disks stencilled out from many varieties of sea shells (in Oceania) or ostrich-eggs (in Africa). Colourful glass beads have penetrated the dark continent to such an extent since the Middle Ages that they have actually become a ' native ' accessory. Large-size carved images and chieftain's chairs are in vogue in West Africa, where their finely carved details are at times completely covered with the glamorous beads. Later, also, the Indians took to them quickly, but developed very definite preferences which changed with the waves of fashion. Many a white man who tried to offer the last decade's fashionable blue beads found out to his chagrin that, for instance, no well-groomed lady next to the Xingu was now willing to accept anything but red beads !

PREHISTORIC NECKLACE
Snail-shells
From the cave Cro-Magnon
Département Dordogne

STONF AGE NECKLACE OF ENGRAVED PEBBLES

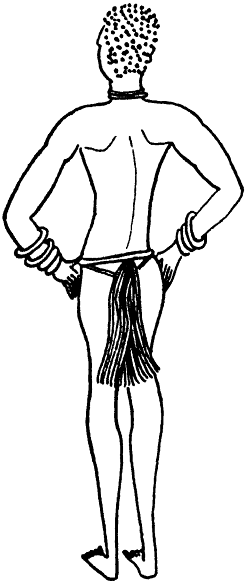
Some tribes, as the south-eastern Californian Kamia, reserved certain species of shells for the men while their women claimed exclusively for themselves the necklaces of beautiful 'blue beads' stencilled out of their own favourite clam. The Australian aborigines have two specified preferences: the baler-shell (*Melo diadema*) ornaments of Queensland, western Central Australia, and north-eastern South Australia, and the pearl-shell (*Meleagrina maxima*) ornaments, worn almost exclusively in the western half of the continent. These decorations are often engraved with delicate ornamentations and worn as large disks on the chest. They can have magic powers, and are effective in the hands of a rejected lover to make a girl's "internal organs shake with emotion," as Spencer and Gillen put it.

ANCIENT NOSE ORNAMENT (GOLD)
Chimu, Peru
After Antze

The masterpieces turned out by the African metal craftsmen reach extraordinary sizes. Even the heaviest pieces, of which often scores are worn, can compete in workmanship with the daintier specimens, as, for instance, the goat's-hair bracelets covered with copper wire. The closer we approach the high cultures, the more precious materials in our sense of the word do we find in the products of exotic jewellery. Among them is the *akori*, the 'blue coral' of Benin, where ancient bronze plates show men so covered with bracelets and necklaces that their mouths were hardly left free for breathing. From old Peru come the 'green pearls' of Chrysocoll and the beautiful sodalith stones gained in the pre-Inca mines of Cerro Sapo. Pure gold was the material used by the African Ashanti as weighting units for the precious dust itself; and the vanished gold coins of the Old and the New Worlds can to-day be found in surprising quantities in the heavy necklaces of the North African desert girls. The invaders of Peru found households full of gadgets for daily use fashioned in pure gold. All this magnificence is worn either on the naked or the clothed body of man, since decorative possessions are as old as and, indeed, frequently older than the clothing. The decisive factor here was the climate.

The Western garb of trousers, vest, and jacket has its origin in the garments of the arctic peoples. For instance, the oldest clothes of some Australian tribes and of the Fuegians consisted of loosely worn fur coats and bast-like bark strings and girdles. To the game-trapping Indians of Labrador a mink coat (in New York the mark of social superiority) is by no means fashionable; a Hudson's Bay Company 'point' blanket is *the* thing—which is another demonstration of the relativity of fashion.

The characteristic items of attire of later developments are the penis case of bark or leaves, often trimmed with feathers, and the flexible belt of bark or raffia. Skirt-like aprons of fibre and spiral-like girdles and raincoats of pandanus leaves are other forms of fashion, but all these manifold forms of clothing or unclothing, including the varying foot-gear of the ages, are not so much accessories of allure as protective necessities. An exception, perhaps, is the earliest form of a very modern accessory of modern allure, the brassière, whose first appearance was as a string used to bind down the developed breasts of grown-up girls. When Father Schulien insisted on an explanation of this custom he was told by the Portuguese East African Atchwabo: "Sir, the breasts vibrate. When the men see this they burn." Many African tribes sport this coquettish string, which is sometimes replaced by a piece of cloth, "to prevent the breasts from moving up and down while the girls are walking."



WOMAN'S COSTUME
North-eastern tribes, Lake Leopold II, Belgian Congo
After Maes

As long as everybody wears about the same outfit one can hardly count the daily garb among the accessories of allure. Only when clothing gains a more individual touch by a greater accessibility of materials, by the development of painted, printed, and woven patterns, and the invention of the button, and other 'unnecessary' trimmings, can we speak of alluring dress. Because true allure is an expression of individual taste.

Another more refined touch comes with the appreciation of perfumes, hardly found in earliest times because most flowers of the tropics have no scent and the secrets of chemistry were not known to the peoples without written history.

The finer gadgets and tools of vanity, the secret boxes, containers, and flasks of the dressing-table, can be traced back to earliest times. Tiny jars for lip rouge, fashioned of bone segments, are known from palæolithic times ; so are mixing-bowls and pestles for the make-up. Small platters for the application of grease paint to the skin, even in the shape of a human hand with outstretched fingers, are equally old and have later been copied in the luxurious materials of ancient Egypt. Richly ornamented slate palettes, bone flasks, and covered ' cold cream ' containers were found in ice-age caves ; and the elaborate inros of Japan are merely the jewel-studded imitations of such flasks. The earliest form of the mirror is the polished shell or metal disk ; the latter's luxurious perfection in the precious metals of Egypt, China, Byzantium, and Greece can be admired in the museums of the world.

The degree of luxury reached during the pre-Christian epochs in the countries of the ancient high cultures has never been equalled or surpassed by the machine-made accessories of allure of our days. Whoever has seen the necklaces of Egypt and of Ur (about 2500 B.C.) in the British Museum will agree with this statement. We all know the perfection of grooming and of sophisticated attractiveness attained by Cleopatra, by the *Arbiter elegantorum* of Rome, and by the Incas of Peru. The Empress Theodora of Byzantium was, as far as grooming is concerned, a living piece of art, from the gold-dust in her bluish hair and the Arabian *stimmi* on her brows to her rosy toes. Her pillows of Chinese silk were filled with the down of the Pontian crane : hundreds of flasks and gadgets covered her vanity table of citrus wood ; her soap came from Spain, and her bath-tub was made of terebinthian wood.

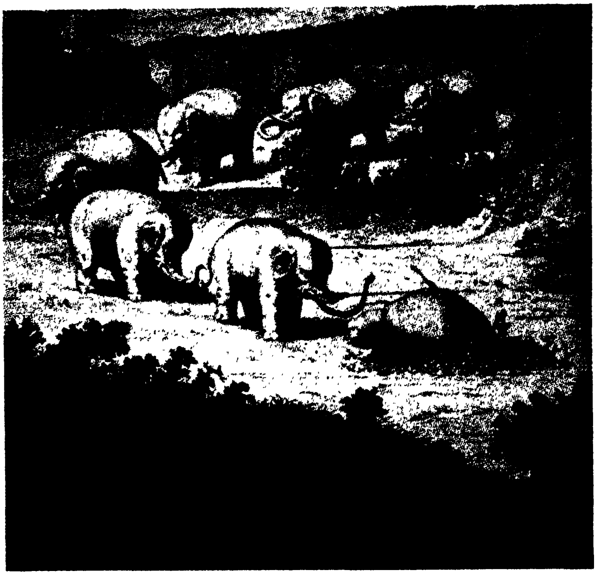
To equal such refinement, our epoch has neither the leisure nor the wealth. Another, more puritan, conception has been given to Western man since the comparatively recent words in the book of Leviticus (xix, 28) were spoken : " Ye shall not make any cuttings in your flesh for the dead, nor print any marks upon you : I am the Lord."

Yet those who do not know of the ' wizardries ' of the written and the printed word have not heard this message, and for this reason the men and women we call primitive still go on enjoying the colours and the jewellery God provided for them in His free realm of nature, and they still do their best to enhance the natural charms of their bodies with the help of skills unforgotten through the millenniums.

CHAPTER THREE

The First Robot

HARD THOUGH LIFE is in the wilderness, early man nevertheless could draw on the intellectual resources denied to his lesser brethren, the members of the animal kingdom. Working with the simplest of gadgets, he began to nurse a dream : to find a medium—human, magical, or otherwise—to help him to carry the burden of daily toil. If he were fortunate enough to remove the cork from the bottle of ingenuity, if he could rub the magic lamp of creativeness, a jinnee might arise whose powers he could put to service. But, alas, his was not the world of *The Arabian Nights* ; and if he were ever to find a magic helper it would have to be created out of his own mind and built with his own hands. This servant would be a machine—indeed, the first machine, the first robot.



PITFALL FOR ELEPHANTS
Hottentots
After Peter Kolb

How great was his need for such a miraculous device ! Especially was this true for peoples not yet acquainted with the comparative security that comes with the knowledge of agriculture. The arduous task of hunting and food gathering often limits man's desire to exercise his individual creativeness. It takes long hours to spot a nest of wild bees high up in some far-away tree and to make the necessary preparations to obtain the honey ; to trail and kill the bird on the wing ; to lurk in the bush for some shy game to pass by ; or to watch the fish for the chance to spear them at a second's warning. All such efforts require a great amount of patience on the part of the hunter. Days may pass before an animal approaches close enough to be bagged. Many a family cannot easily stand the strain of waiting too long for provisions in a society where the foresight to store staple foods in time of plenty is not yet developed, or where that ' time of plenty ' may never come.

The ingenuity of man tried to overcome these hardships. Better undoubtedly than the club or the stone as hunting tools were the arrow, the harpoon, the lasso, the bola, the butterfly-net, and the hand-thrown snare. True, these all still required the hunter's constant presence and alertness, but they either augmented the power of his bare hands or held the game securely until the hunter could reach it. Some tools enabled the hunter to capture more than one bird or animal at a time—for instance, when he used the game net and counted on the co-operation of his fellow-hunters to drive many prey into its entangling meshes. From the times of the Pharaoh Haremheb up to our day quail and other birds have been hunted by this method of spreading out over a field a weighted net into which the game birds are driven by helpers. This method is used to-day by the Dayaks of Borneo who catch deer with a set of perpendicularly arranged nets ; by the East African Washamba who catch antelope and gazelles ; and by the Eskimos of Bering Strait who bag rabbits. They are first driven into nets and then killed by hand. Compared with earlier methods, these were improvements, but the continuous presence of the hunter was still the invariable prerequisite to success.

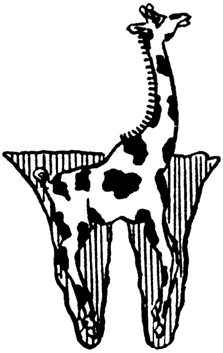
Similar methods include obstructing the flight of a flock of birds by nets. Following this method, the Siberians hunt geese, while the Eskimos along the Yukon catch the white partridge with their salmon nets. The battue principle applies a somewhat different method. Thus, it was common among the North American prairie tribes to hunt the buffalo by driving the herds along two converging fences over a bluff. Certain primitive methods of bird-catching have become part of our own hunting customs. The prey is attracted either by whistling or by decoys from behind a blind. Then the hunter releases by hand a mechanism for capturing it; finally he imprisons the bird in a container, cage, or net.

While the possibilities of a successful hunt were increased by all such devices, the main problem had not yet been solved—to achieve equal results without the continuous presence of the hunter at or near the catching spot. If the waiting, the handling, and releasing of the weapon or catching tool, and the holding or killing of the game could be replaced by mechanical devices a real step towards a greater amount of personal freedom for the hunter would indeed have been achieved. The invention of such a device would enable him to stay at home while his hunting was being taken care of, and to exploit several game tracks simultaneously. In the time thus gained he would be able to pursue other useful trades and handicrafts, or he could play and dance and sing and have a good time. Perhaps it really was complacency and laziness that inspired the first primitive genius to invent such devices. We don't know for sure, but the very sounds of the words 'work,' '*travail*,' '*Arbeit*,' and the '*Aйyxhem !*' of the Volga boatmen have so hollow a ring that they all seem to express the depression of hard-labouring men everywhere.

The day came when this first revolutionary invention was actually made; when man for the first time built a machine which worked for him during his absence; when human intelligence created a robot to take his place with mechanical precision. This miraculous tool was the animal-trap.

It worked like the net, the club, the hand-thrown snare, only more precisely and effectively. In addition, its capacities were greater than the much weaker efforts of the human hand which it replaced. By the application of lever principles attached to the delicate release mechanisms, the slightest touch would set into motion the weight of considerable, even tremendous powers, skilfully matched to the game animal's strength. Primitive man certainly had no text-book knowledge of the principles of physics and was ignorant of the causes of mechanical phenomena, but he was, nevertheless, shrewd enough as an observer to imitate by mechanical means what he had seen in nature. The living branch, jerking back to its natural position after an accidental dislocation; the weight of dead trees thundering down the hill after a hurricane; the hazards created by a branch-covered hole in the ground—these and others were early man's physics teachers, and he made skilful use of what he had learned from them. After he saw that his devices worked he did not stop with the invention of just one kind of trap. Combining his mechanical knowledge with his unexcelled knowledge of the peculiarities of climate and of the behaviour of animals in his locality, he succeeded in devising hundreds of different models of traps, all cunningly adapted to the special conditions of his surroundings.

For the effectiveness of his robot he made use of the currents of water ; the slippery quality of ice ; the thirst of a jungle beast trotting along its path to the spring ; the bear's sweet tooth ; the curiosity of the whisky-jack ; the robber instinct of the owl ; the shyness of nocturnal creatures ; and the pride of the lynx who will jump once to get free, but never a second time. Knowing the peculiarities of his prey, he thwarted even their keen sense of smell by destroying all odours of the human hand left on his machine and, as the modern criminal uses his own methods to avoid tell-tale fingerprints, the man of nature covered up his scent by singeing wood, by the use of ' living ' twines and glues, and by the scents of nature—resin, blood, or animal scents like *castoreum*. To mislead the eye of the game as well, he added a masterful art of camouflage by building artificial pens around his machine or covering it with branches, and by spreading bunches of dry savannah grass over the deadly pits he had dug in the soil.

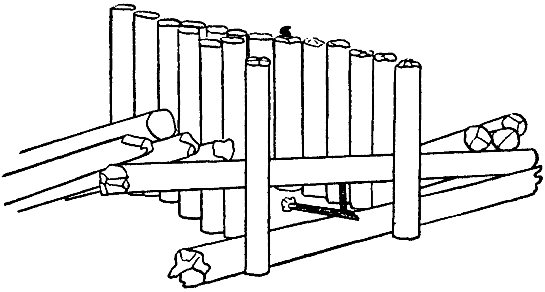


GIRAFFE PITFALL
Kafirs, South Africa
After Wood

The hundreds of traps he invented, in all sizes, from the bamboo tube for mice to the enormous models for giraffes and elephants, have amazed scientists for years. Many museums possess, in the collections brought back by their explorers, traps or parts of traps which can be neither properly identified nor assembled. It takes a specialized knowledge to reconstruct these machines, and often this can only be done after a previous thorough study of the tribe, climate, and fauna concerned.

Varied as the applied physical principles are, all machines that hold or kill the game animal without the presence of the hunter can be classified in four major groups according to the motive principle used. The recognition of these groups furnishes one of the most fascinating insights into the great intelligence displayed by early man in his efforts to improve his standards of living. These four principal types of trap occur in all imaginable versions and varieties ; often one or more of them are combined for the sake of greater effectiveness.

The GRAVITY TRAP, as its name implies, makes use of weight to achieve the desired effect of catching a special animal—either the weight of the animal itself, or the power of the one or more falling objects so arranged that they hit the victim after the release of the mechanism. The only existing gravity trap of the first kind, using an animal's own weight to bring about the capture, is the pit trap. Generally it merely consists of a deep hole dug in the middle of an animal track, its opening carefully camouflaged by branches, moss, leaves, and the like. The prey steps unsuspectingly upon this covering which gives way, thus catching the victim in the narrow excavation whose dimensions correspond exactly to its size. To prevent escape, several methods are used. The possibility of the animal jumping or climbing out of the hole is eliminated by sufficient depth of the hole, or by its conic shape, into which the animal is wedged by its own weight.



GRAVITY TRAP FOR BEARS, WOLVES, AND OTTERS

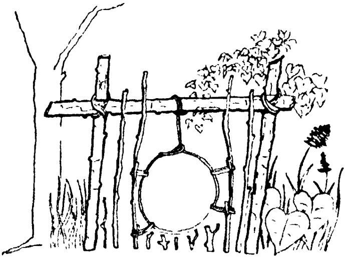
Tahltan Indians, North America

After Emmons

The Bushmen catch the giraffe by dividing the bottom of the pit into two sections, leaving a central ridge of soil. The trapped animal rides helplessly on the ridge, unable to lift its long legs from the trap. To increase the effectiveness of the pitfall, pointed sticks are occasionally rammed into the bottom of the hole to pierce or wound the animal. This type of trap is not only used singly, but also several may be arranged at regular intervals along a fence or in great numbers on game paths leading to the watering-place. Frequently converging hedgerows of considerable length make an alley to the pits.

This very effective method was, as we may recall, often copied by the white man during the Second World War when ' the animal's own weight' was the weight of our modern dinosaurian, the tank, which plunged into similarly camouflaged pits.

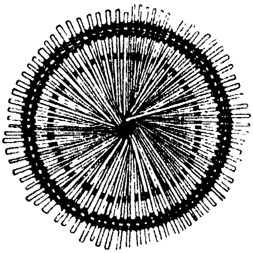
The second type of gravity trap uses a log, or a combination of other heavy objects, released by the animal itself to effect its capture or to kill it. As a result of primitive man's experience that falling logs create a force which increases in proportion to the height of their fall, this height is artificially increased to the greatest limit of effectiveness. The simplest example of such a trap is a heavy stone held in equilibrium by a small stick which holds the bait and acts as a release mechanism. Pulling at the lure, the animal causes the stone to fall down upon it. However, this type of release is ineffective whenever the weight to be released is too heavy, because then the animal can nibble on the bait without actually releasing the trap. The solution was found by adding a system of force-reducing levers and by developing a trigger device. Such traps are used all over the world, especially by the peoples of the arctic cultures. Increasingly heavier objects were heaped on the striking beam which, in turn, required more and more delicate construction of the release mechanism. The result was astounding. The Montagnais-Naskapi build bear traps weighted by four or five heavy logs which are sprung by the mere touch of the victim's inquisitive nose.



SNARE TRAP
Labrador Indians
After Lips

Having perfected the gravity trap, the primitive hunter applied other laws of nature. Observing animals occasionally strangling themselves in the liana thicket of the primeval forest, early man evolved the SNARE TRAP. Utilizing the forward movement of the animal, he sets this device mostly on a vertical plane. Since the most sensitive part of the bodies of most game animals is the region of the neck, snares are set on a game path in such a way that the head of the prey enters the noose, which tightens like a lasso. To keep and to hold the snare open, a number of secondary appliances are needed. Here, too, combinations of fences are often used with the snares set at the openings.

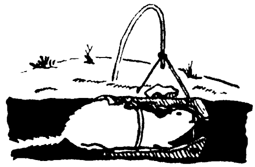
An apparatus still in use in many parts of the Old World is the wheel trap, based upon the snare principle. To build it, a number of pointed flexible sticks are inserted from the outside into a wreath of fibres in such a way that their points join each other at the centre. Attached to a tree or pole, this trap is laid in the game path, most often over a small pit. When the victim steps on it the flexible spikes give way to its foot, inserting themselves, when the animal tries to escape, into its tender fetlock. The greater its efforts to get free, the more severe is the pain, since the pointed sticks penetrate ever deeper into the flesh. An additional snare is sometimes laid round this spiked-wheel trap to close as soon as the animal tries to escape.



SPIKED-WHEEL TRAP
Maka, Cameroons, West Africa
After G. Lindblom

The third principal trap system, the SPRINGING-POLE TRAP, is still in daily use among many peoples of Africa, Asia and America. It is based on the power principle of the inertia of a flexible stick. The material used as a spring is a bent tree or a branch which naturally seeks to regain its equilibrium. This, however, requires that the tree or branch be firmly connected to some arrangement by which the motive power can be utilized. This, in the case of the spring-pole trap, is usually a snare.

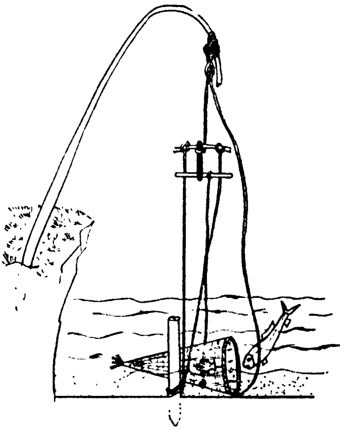
This type of trap is generally used by agricultural peoples, who use it to catch smaller animals as a supplementary addition to their diet. Their more sedentary way of life gives them the leisure to build this kind of trap and refine its release mechanisms in numerous variations. Any engineer who concerns himself with the problems of kinematics or the mechanism of driving gears will recognize the arrangement of these release constructions as the oldest application of relay structures which occupy a paramount place in modern technique.



SPRINGING-POLE TRAP FOR MARMOTS
Eskimo
After E. W. Nelson

The application of the springing-pole trap with its pull principle is not limited to animal traps alone ; the inertia of the bent rod serves many other purposes. In the Middle Congo springing poles are used for the execution of slaves and prisoners of war, whose heads are snapped off by the force of the blow. The modern gallows used for executions are by no means authentic springing-pole traps. They are not traps at all. Requiring the presence of the executioner, the gallows is merely a 'trap-like catching method.' The natives of Borneo and Hindustan set the bellows of their iron-melting furnaces in action with the help of springing poles. A similar utilization is found on northern European farmers' stoves, and in Eastern Asia they furnish the power for native weaving looms. Occasionally the spring-pole trap is used for fishing, with a hook or a fish-pot taking the place of the snare.

Other forms of the springing-pole trap principle have helped primitive man in his war efforts and in his peace-time entertainment, because the springing-pole trap is the forerunner of both the shooting bow and the cross-bow, as well as of the violin bow and all stringed instruments. Primitive man transformed the springing-pole trap into a music bow by mounting it on a soundboard such as an empty pumpkin shell. By the addition of a number of such musical bows, he created the first stringed instruments, the forerunners of our modern violins, 'cellos, etc. Both the shooting bow and the cross-bow, as weapons, have their origin in the springing-pole trap; we can trace back the latter to China of the twelfth century B.C. The revolutionizing influence of the cross-bow weapon in the wars of antiquity is familiar to all students of history. It is possibly no overstatement to say that the might of the Roman Empire would have been impossible without the ancient cross-bow, based upon principles first developed by primitive man in his construction of animal traps.



SPRINGING-POLE TRAP WITH FISH-POT

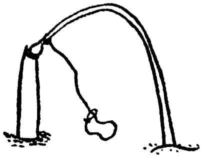
Bangongo, West Africa

After Torday-Joyce

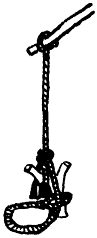
The TORSION TRAP, finally, is based upon another widely applied power principle. Man had observed that a twisted elastic string tends to regain its original form and, if prevented from doing so, generates considerable power. The force of torsion was applied to sinews, roots, or fibres. By attaching to these a leverage device the torsional force was effectively directed. A frame, often combined with a net, caught the animal; or a wooden board was forced downwards on the victim. All torsion traps are designed for close action, since success is possible only in its immediate vicinity.

This kind of trap had its origin in the high-culture regions of

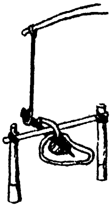
RELEASE MECHANISMS OF SPRINGING-POLE TRAPS



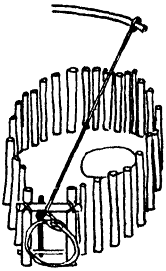
Winnebago,
North America



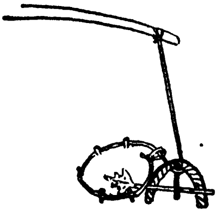
Kwakiutl,
North America



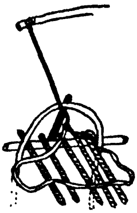
Makusi,
Guiana,
South America



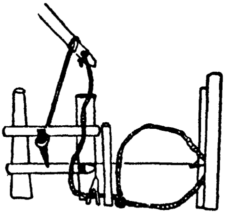
Pomeroon
River,
Guiana,
South America



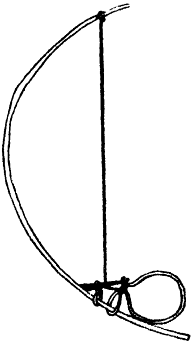
Bushongo,
West Africa



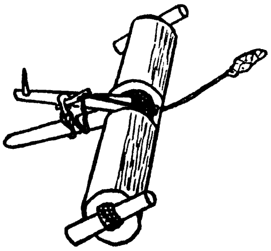
Arawak,
Guiana,
South America



Pangwe,
West Africa



ONE-PIECE SPRINGING-POLE
TRAP FOR RATS
Jaunde, West Africa
After G. Tessmann



TORSION TRAP FOR
WOLVES AND FOXES
Eskimo, Norton Sound
After Lips

Asia and Africa, being later more widely diffused. Wherever it is in use among primitive tribes like the Eskimo and Chukchee, it has been secondarily adopted and is not a result of their own invention. The entire construction of these traps is similar to our modern steel traps, even though the materials used are different. All steel traps in modern stores, from the simple mouse-trap to the huge traps that are used for capturing the largest animals, are simply torsion traps which vary only in their construction material from those used by their original inventors.

The Greeks adopted the torsion principle from the Orient. It reached a high degree of perfection in the gigantic Roman throwing machines (*euthytons*, *catapults*, *onagers*, *tollenos*). The necessary tows consisted of twined sinews, a material even to-day used for the wolf and fox traps of the Norton Sound Eskimos. The ballistic machines of ancient times were so effective that some European museums put theirs at the disposal of their governments during the First World War, and they were actually used for the throwing of mines.

The animal trap invented by primitive man has opened so many roads to modern technological development that no one who has followed the development of this first robot will deny its overwhelming importance. The invention of the first animal trap was certainly of greater consequence to the history of mankind than the invention of the wheel. The application of the newly found motive powers in building the animal traps had greater consequences than any other single invention in the technological history of mankind.

When was it that early man began to subdue the forces of nature to make them work at his command ? It must have been tens of thousands of years ago that the genius of early man invented traps. There is no people on this earth that does not know of one or the other principle for making traps ; even the anthropologically oldest cultures know them. Prehistoric facts are equally conclusive, and sometimes offer us the possibility of dating the different kinds of trap devices.

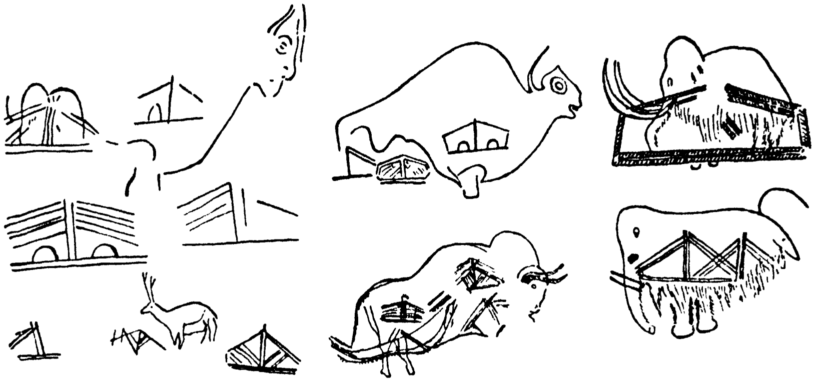
In the region of the Garonne River of Southern France (especially in Dordogne), and across the Pyrenees, in the Basque country of Biscaya, certain prehistoric caverns have been discovered which have been identified beyond any doubt as the human abodes and places of worship occupied during the Later Palæolithic period of Europe. There have been found in these caverns strange examples of the art of early man, expecially certain unusual drawings of animals like buffaloes and mammoths. Beautifully preserved in their glowing red and yellow-ochre colours through the millenniums, these pictures offer a strange sight because the animal portraits, drawn in very naturalistic style, are always combined with mysterious geometric symbols which sometimes were even painted on the animals themselves. A peculiar feature of these representations is the fact that these animal portraits in their combination with the geometrical signs did not appear close to the cave entrances, but rather, were always found far back in their interior, removed from daylight and visible only by means of artificial lighting. The hidden locations of these paintings makes it obvious that they were not meant to serve as an art gallery of the ice age. Just what their purpose was mystified scholars for some time.

In the search for an answer, scientists made use of certain facts. First, it was known that the chief form of economy during the Glacial period was that of hunting and that, therefore, the animal was pre-eminent in early man's mind. Secondly, the hunting habits of such primitive tribes as the arctic peoples, the Bushmen, and the Australian aborigines who, though living to-day, are still on the same cultural and economic level as the Ice Age man, provide clues to and suggest possible explanations of the mysterious cave paintings.

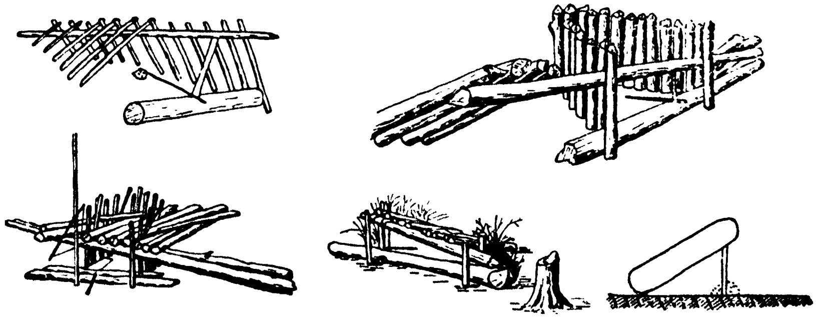
Even to-day, African Bushmen as well as Australian natives get together on the evening before a hunt and perform magical dances and rites to safeguard its success. A witch doctor is their song and show leader. The likeness of the game to be hunted, be it kangaroo or antelope, is either drawn in the sand or painted with ochre on a rocky wall. The hunters then gather round this image and run their spears through the picture of the animal. Without this procedure, these tribes are firmly convinced, they would be unable to bag animals the following day. In the mind of primitive man there is no differentiation between an object and its image ; to him the drawn picture and the animal itself are identical. Accordingly, the drawn and pierced animal has been killed already, and the hunt of the coming day is not much more than a formality.

It is no far-fetched idea, therefore, to interpret the paintings inside the caves of palæolithic man as similar magic hunting rites. This view is further supported by the presence in the caves of other pictures representing dancing witch doctors wearing animal masks, another practice equally frequent among primitive tribes of our time who believe that these images favourably influence the multiplying of the game and give good luck to the hunter.

If these same practices were used by the ice-age hunter how was he able to hunt such mighty animals as the buffalo and mammoth, against which his primitive hunting tools would seem inadequate ? This question was solved by modern scientific interpretation : nowadays those mystical symbols, formerly known as *signes obscurs*, have found their correct explanation. To-day there is no shadow of a doubt left in international science that they represent outline drawings of animal traps, recorded so realistically tens of millenniums ago by the early inhabitants of Europe in their caverns of Spain and France that even the details of their construction and the variety of their types are known. And we know now that these earliest machines are ten thousand



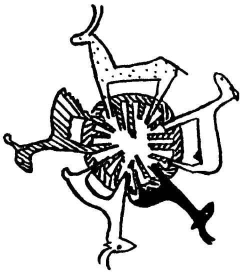
GRAVITY TRAPS
Ice Age drawings
After Lips



GRAVITY TRAPS
In use by primitive peoples of to-day

to twenty thousand years old. The pictures in the caves originated during the third Glacial period and the post-Glacial periods which took place in these regions, as science can prove, during the years from 20,000 to 8000 B.C.

In these ancient drawings we recognize now without difficulty the gravity trap (drawn on the body of a gigantic buffalo in the cavern of Font-de-Gaume) which is in use among today's primitive tribes all over the world. With this same model the South African Bushman catches the hyena; the North American Tahltan Indian, the wolf; the Blackfoot Indian, the jackal; the East African native of the Maconde Plateau, the antelope; and the Labrador Indian, the bear.

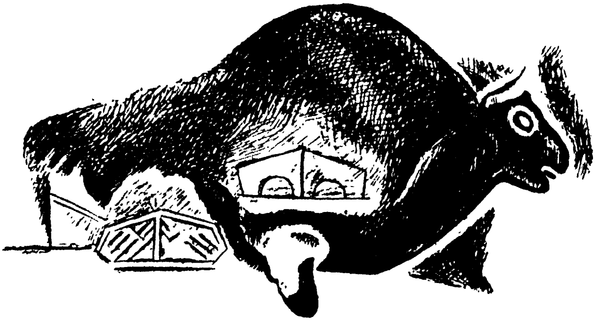


MURALS FROM AN ANCIENT EGYPTIAN GRAVE, DEPICTING GAZELLES CAUGHT IN WHEEL TRAP

Hieraconpolis, Egypt

After J. Kapart

In terms of world-wide distribution and extraordinary age, the spiked-wheel trap is certainly the most interesting of hunting devices. We find it clearly depicted in many prehistoric caves and in ancient Egyptian tombs, as for instance on the mural at Hieraconpolis. The Swedish scientist, Lindblom, has traced it through Africa and Asia, in Asia as far as the Karakorum, the Etsingol, and even the Amur. Frobenius published its likeness as shown on the palæolithic rock paintings of Fezzan, and Breuil's pictures from Tabel Bala show its wide use in the Sahara.



ICE AGE DRAWINGS OF GRAVITY TRAPS ON BUFFALO

Cave Font-de-Gaume

After Capitan, Breuil, and Peyrony

Strange as the idea may seem to some one not familiar with the facts of man's first robot, we know now that our utilization of the four main power principles, extensively employed in our modern technology, originated from unknown and unnamed inventors of the Glacial period who lived on this earth tens of millenniums before our time. Long before Archimedes they invented, based upon the application of the laws of leverage, the important relay and release mechanisms whose analogous application in modern machinery can easily be observed by any layman, even if their construction has undergone considerable improvements.

Applying the principles of the gravity trap, the old Egyptians utilized its general possibilities by creating the slot-machine. Heron of Alexandria provides us with the drawing of such a machine for the sale of consecrated water. In it the inserted coin fell upon a 'trap' lever mechanism, thereby opening a flap valve from the faucet of which flowed exactly the amount of water the coin had paid for. To-day, when we receive a sandwich or a postage stamp or a package of chewing gum by inserting a coin in the slot of a slot-machine, we only prove the efficiency of the gravity trap; the coin assumes the rôle of the animal whose weight regulated by the distance of the fall sets the release mechanism into motion. The same principle rules the operation of the slot-machine, the turnstile, and the self-playing gramophone.

Two modern 'traps' without primitive forerunners are the 'electric-eye' gate whose beam of light, when broken by an approaching person's shadow, automatically opens a door, and the famed 'electronic rat-trap,' which has a similar photo-electric mechanism. Both are real traps, not 'trap-like catching methods,' since they do not require the presence of any human attendant to become effective. In both cases, the newly added touch is derived from the electronic wizardry of the twentieth century, but the old robot idea of exercising power even in the absence of man himself is as old as the ice age.

TRAP CHARM

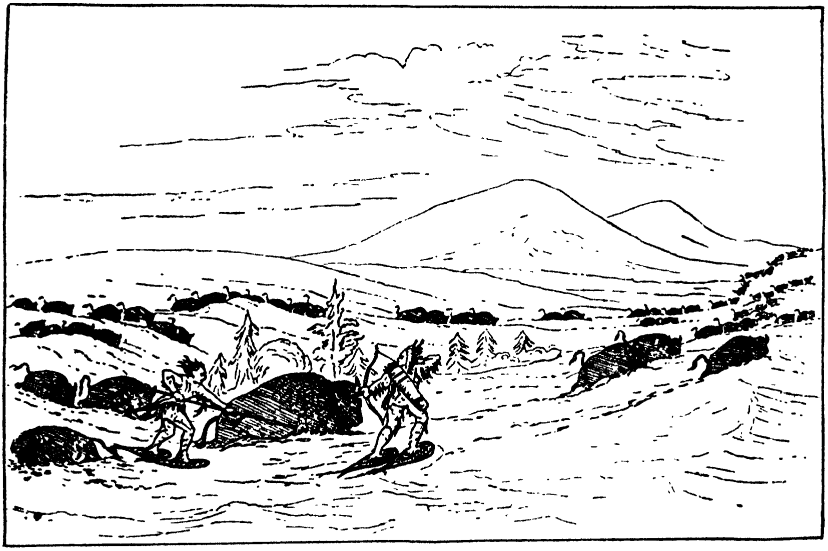
North Borneo

Museum of Ethnology, Cologne

CHAPTER FOUR

This Friendly Earth

FROM THE BEGINNINGS of time the very subsistence of human life has depended upon the gifts which this old earth chooses to grant to man. Bread and meat, fish, fruit, and vegetables—the foundations of our present-day diet—are still the same basic means of existence as they were when the first human beings walked on the earth. Even in our ' Atomic Age ' we have not yet been able to create either nectar and ambrosia or the philosopher's pill as substitutes for these fundamental foodstuffs. The only difference is that the size of our world has shrunk. It is now, more than ever, One World.



INDIAN HUNTERS ON SNOW-SHOES

By courtesy of the American Museum of Natural History, New York

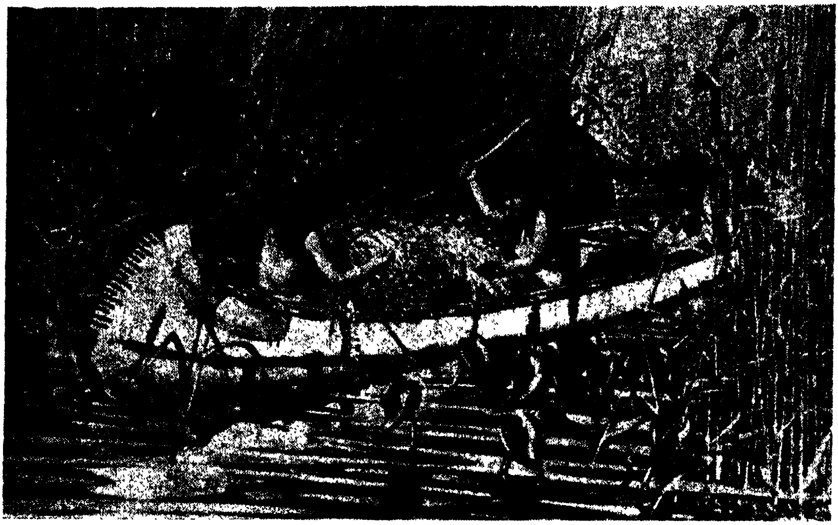
When drought dooms the wheat harvests of Argentina and Canada or the rice harvests of Burma and Siam ; when the meat production of the cattle-producing countries lets us down, starvation rules the earth exactly as hunger harassed the much smaller worlds of primitive men when the buffalo herds stayed away from the prairies, when the caribous of the Canadian Indians failed to appear, when the waters of the Nile refused to rise in Egypt, when *glossina*, the tsetse-fly, decimated the East African herds, when the Siberian reindeer withdrew to the farthest northern reaches, when the heat killed the African Bushmen's wild melons, when the nardoo seed and the bunya-bunya burned in Australia.

Although we have created the prerequisites for increasing the population of the globe by learning to wrest more food from the soil, in principle, our food exploits are still based on the ancient practices of our forefathers. Like them, we are still dependent upon the products of the vegetable and the animal kingdoms. To-day, as millenniums ago, the tilling of the soil and the art of husbandry are foundations of our nourishment ; and neither our primitive ancestors nor we moderns have been able to overcome the hazards of climate.

All growth of animal and plant food depends on climate to the largest extent. Indirectly, all forms of human life are shaped by the influences of climate. Man has, therefore, been compelled to adjust his habits and possessions and all his material needs to the climate into which he was born. Correspondingly, the members of the animal kingdom had to adapt their organisms and the functions of their bodies to its whims.

Subjected to probably the most severe climatic changes, and consequently to the greatest changes of flora and fauna, was the race which for over seventy-five thousand years made the history of the Stone Age—the race of the Neanderthal man. The ingenuity of this very ancient race was able to cope with the tremendous changes of the climate by a successful economic and cultural adjustment to the shifting environment. Although the Neanderthal man had not yet developed a knowledge of husbandry and of the cultivation of plants, it was perhaps just this very ignorance which made it possible for him to survive under continuously changing conditions. He subsisted on whatever nature offered him.

Characteristic of the form of economy of this early palæolithic man is the common hunt, in which a group of tribesmen joined. Plant foods of wild berries, seeds and wild fruits were supplemented by the meat of the rhinoceros and mammoth, reindeer and aurox, and woolly nasicorn and cave bear. The extant hunting tools and weapons of these people indicate that it must have been impossible for the individual hunter to kill any of these animal giants without the co-operation of others ; hence the collective



CHIPPEWA WOMEN

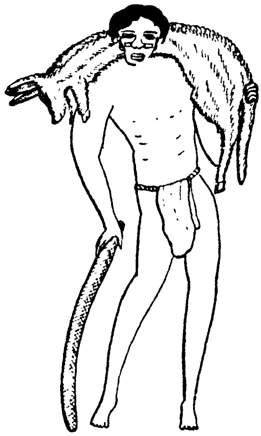
Beating off the kernels of wild rice into the bottom of their canoe

By courtesy of the American Museum of Natural History, New York

IROQUOIS INDIANS

Harvesting corn

By courtesy of the American Museum of Natural History New York hunt. The form of economy of the Ice Age consequently necessitated the organization of bands as a prerequisite for the survival of the individual. Another factor indicating the co-operation of the whole group was the fact that the quantity of meat obtained from a single prey animal surpassed by far the needs of one individual family and was sufficient to allow its distribution beyond the family circle. The reasons for this social practice were by no means humanitarian, the 'share-all' being dictated by economic need. This method of distribution of the hunted game among all had the further advantage that, in case of bad hunting luck of one group, all could share in the benefits obtained by others. With its knowledge of the battue hunt, it was this type of society that developed also the first robots, the first animal traps.



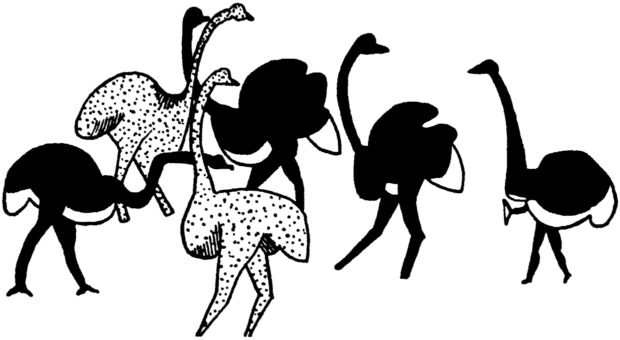
AUSTRALIAN HUNTER

This form of economy of the early Palæolithic Age, which has been established as the indisputably oldest of all forms of economy known to man, is by no means extinct to-day. It is practised in our time by all those primitive tribes whom we call hunters and food gatherers.

Under varied geographic conditions, they are scattered all over the globe. They live in the regions of the tropical, primeval forests everywhere : the Pygmies of Africa, the Veddas of Ceylon, the Semang and Senoi of the Malacca Peninsula, the Kubu of Sumatra, others of South Asia, and in South America numerous bands of the Gês family. The Bushmen of South Africa and many Australian tribes are the hunters and food gatherers of the sub-tropical steppes and deserts. The Fuegians of the extreme southern American sea-coast are their sub-arctic counterparts. The economic practices of these peoples show distinct relation to the varied climatic conditions of their respective habitats. The outstanding characteristic is the lack of stability in their lives caused by the scarcity of food. To survive, even their smallest groups must often exploit large territories, which compels them to make continuous migrations.

At this early stage of social development, a division of labour was developed, with the women mainly gathering the vegetal products like fruits, bulbs, roots, and seeds, and the men providing meat and fish. The women's tool to break the soil for getting at bulbs and tubers is the simple digging stick, mostly consisting of a pointed branch. The men's hunting weapons are spears and clubs and, in some cases, bows and arrows.

The skill with which they use their primitive tools is amazing to an observer. They feel and act, as the explorer Seiwert says of the Bagielli, a Pygmy tribe of the Cameroons, like 'lords of the forest.' Despite their small stature they fearlessly attack chimpanzee and gorilla, leopard and buffalo, and even the mighty elephant. The same author's description of one of their methods of elephant hunting shows interesting analogies to the mammoth hunts of the Ice Age.



HUNTER IN OSTRICH MASK, APPROACHING OSTRICHES

Bushman Drawing

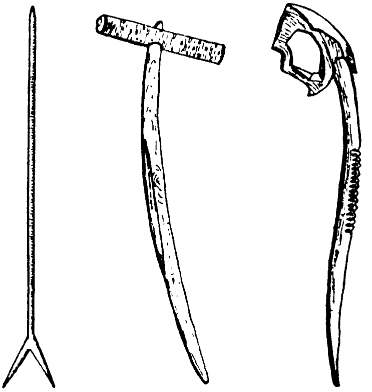
After Stow

> They first cover their entire bodies with fresh elephant dung, which enables them to cover up the human scent and to approach the animal unsuspectedly. Creeping on their bellies, they advance slowly, until they reach the animal itself, to suddenly push with great power a poisoned spear into the soft lower parts of its body; whereupon it soon collapses. With their sharp bush-knife they then cut off the trunk, and their victim bleeds to death.

This is just one example of early man's many ingenious methods of overcoming by ruse the drawbacks of his primitive equipment. He is equally inventive when it comes to the full exploitation of available plant foods. As soon as one area has been exhausted new quarters are set up in another, until an entire district, often several square miles, has been completely exploited. With the change of seasons, the gathered products change. Thus in dry seasons the Bushmen collect by the thousands ripened spike melons growing on the barren sands of the Kalahari. These melons enable them to live without water.

A well-established tradition prevents these tribes of the hunting and food-gathering stage from devouring everything in sight. They discriminate carefully between useful and harmful plants, and exclude the latter from their diet. The discovery of a new food plant is, to them, a great invention. The cousins Sarasin name forty plant and twenty animal species which are used for food by the Vedda tribe. The Australian aborigines' usage of edible plants is even greater; Thomas mentions three hundred of them.

DIGGING STICKS



Gran Chaco British Columbia British Columbia

As for the size of the hunting and food-gathering groups, it is logical that bands are smallest where food conditions are most unfavourable, as in Tasmania, Australia, and in the arctic region. The average Tasmanian group consisted, according to H. L. Roth, of only three or four huts, inhabited by three or four individuals each. The most numerous group among the primitives of Malacca visited by Martin had twenty-seven people. Seligman found the Veddas living in bands of one to five families. According to Malinowski, most Australians roam in small units of two or three families, with a total of six to nine persons. With more favourable economic conditions, the bands grow in size. A Kurnai group of south-eastern Australia was, as Howitt states, composed of eight families; a Wurunjeri group of six. In the Bushman territory Passarge found communities living together under twelve adjoining windbreaks. The Andamanese settle in groups of about fifty individuals.

But even if we recognize the hunters and food gatherers as adherents of the oldest form of economic activity, their way of life constitutes by no means 'the beginning.' Their many technical skills, their knowledge of weapons, traps, hunting methods, and cooking with fire, evidence a long previous development. During former centuries man's intellectual superiority had made him surpass the animals which are still forced to adjust their bodies to the available food in its natural form. Man had found the proper methods of preparing what he found in a way most suitable for his organism. By changing the raw materials of his diet with the help of fire, he made his food tasty and digestible.

How humanity advanced from this earliest acquisitive economy to the higher stage of agriculture and the domestication of animals is one of the most fascinating problems of ancient and modern science. The scholars of classic Greece pondered over this question. They distinguished three forms of economy: their own, based on agriculture; a second, applied by the cattle-breeding nomads on the rims of the Grecian world; and a third, the purely acquisitive system of food gathering and hunting. But the champions of this conception made the fundamental mistake of forcing these three coexistent cultures into a chronological sequence. From their error arose the theory of the "three stages" of hunting, cattle breeding, and agriculture—a theory that was widely accepted for many centuries without refutations. The initial stage of food gathering and hunting was described either as the golden age of paradise or as a semi-animalic period of complete savagery. This persistent theory of the three stages of human economy was reflected in the eighteenth-century writings of Rousseau and Adam Smith. Its nineteenth-century prophets were, among others, Friedrich List and the Italian S. Cognetti de Martiis, the French expert on prehistory Mortillet, and the Belgian Laveleye.

However, this old theory and especially its assumption of a chronological sequence could no longer be upheld in view of the increasing ethnological material and the new scientific facts brought in from the field. The works of Ernst Grosse and Eduard Hahn especially cast new light upon the different economic forms of human society. Yet even to-day the scientific struggle about the question of the origin and invention of agriculture and cattle breeding has not come to an end. Many scholars still try to explain the advance from the acquisitive to a productive form of economy with the help of psychological analysis. Taylor, for example, believed that the invention of agriculture was no complicated 'invention' at all. He held that it was quite natural for hunters and food gatherers to sow or plant the familiar seeds and roots in a suitable spot. As a consequence of this habit, he argues, the roaming hunters and food gatherers settled down, thereby laying the foundation for a higher form of existence, culturally speaking.

On a closer view these psychological explanations turn out to be mere conjectures. The ethnological facts show with great clearness that the psychological preparedness (one of the most important elements of which is the capacity to wait for the fruit or plant to ripen) to proceed to agriculture was non-existent in the minds of the hunters and food gatherers. Whenever and wherever benevolent white men have tried to convert acquisitive tribes to agriculture the results have always shown that the greatest enemies of the new and better form of life were the prospective converts themselves. The seeds distributed for planting either went directly into the stomach instead of into the soil or, when the fields were prepared by white experts, the immature young plants were pulled up and eaten on the spot.

The Brazilian Government chose the Bororo, a hunting and food-gathering tribe, as 'guinea-pigs' in an agricultural experiment. They received soil and seeds. The fields were prepared for them by government crews, and they were provided with enough additional foodstuffs to subsist until harvest time. What happened? As soon as the natives were the happy possessors of axes they had a good time cutting down the Piki trees they formerly had to climb in order to pick the fruit. The sugar-cane plantations needed permanent sentries to protect them from complete destruction. The cassava fields were ruined. The women, accustomed to the digging of roots in the forest, pulled up the growing shrubs and went to work with their digging sticks, looking for 'hidden roots.'

A white missionary who tried to make the African Wasekele, a hunting and food-gathering tribe, appreciate the blessings of agriculture and Christianity combined, received the shrewd rebuke: "Do the monkeys die of hunger? We know the forests and the waterways. We move from place to place, because God wants us to. We must not touch a hoe to till the soil, because God has forbidden us to do so." Who is not reminded by these words of the "lilies of the field"?

The Negritos of Luzon who have been persuaded at times to try a little planting, "do not want to be tied down to a fixed place," Vanoverbergh states. He adds: "Very often, before their plants bear fruit, they are already far away in some other part of the forest."

One of the best examples of the hunters' and food gatherers' complete inability to invent or develop agriculture is furnished by an old tale of the Pygmies of the Belgian Congo, who, proud of their courage and their liberty, regard themselves as superior to the agricultural Negroes among whom they live without ever adopting their form of economy. The tale, recorded by Schebesta, deals with the right of the Pygmies to collect bananas from the Negroes' plantations.

> A Pygmy, on his roamings through the forest, came one day to a chimpanzee village. He was accompanied by a Negro. There they saw, for the first time in their lives, a group of banana-trees laden with golden fruit. Since they believed the fruit to be poisonous they did not dare to try their taste. The Negro, however, kept encouraging his companion, the Pygmy, to find out what their taste was like. Finally, the Pygmy ate some and found that they were delicious. In spite of this, the Negro still did not dare to do likewise. In the evening, as they went to sleep, the Negro was convinced that his companion would die of the ' poisonous ' fruit during the night. To his great surprise, he found him alive in the morning. Now, he himself finally dared to eat of the new fruit, and he, too, found it excellent. Both thought of ways to take bananas along to plant them near their homes. The Pygmy took some of the fruit and laughed at the ' stupid ' Negro who took some of the shoots of the tree for slips. Both went home. The dwarf planted the fruits in the wilderness ; the Negro set the shoots in his plantation. But the Pygmy waited in vain for his bananas to grow. They rotted in the soil, and that was that. How great, however, was his surprise when he came months later to the Negro's village where he found a group of beautifully grown banana-trees full of fruit ! Nevertheless he pointed out to the Negro that he was not a planter and that he preferred by far to pursue his hunt. He advised the Negro to go on planting bananas because from time to time he would drop in to get his share. Since that time, the Bambuti claim the right to gather bananas in the Negroes' plantations, because the Pygmies are the inventors of the fruit and only through them the Negroes learned to eat them.

These are only a few examples. They demonstrate that conjectures based upon our present-day psychology do not lead us anywhere in an effort to determine the step from food gatherers and hunters to agriculture and the domestication of animals.

Another presumption that lingers in the mind of many an anthropologist and economist does not clear the way either. This is the idea that sedentariness was the result of agriculture. This presumption holds that it was not until the invention of agriculture that mankind became relatively sedentary and that sedentariness was a consequence of, and not a prerequisite for, the invention of agriculture. This opinion, too, is a psychological construction which is not borne out by the facts. There can be no doubt that at least a relative sedentariness was the necessity from which an invention of agriculture could derive. Furthermore, the inventors of the higher forms of economy had to possess the necessary psychological readiness, the attitude of waiting for the ripening of the fruit.

What groups of people, then, possess all the psychological and factual prerequisites to become the inventors of agriculture ?

They exist, indeed, furnishing by their type of economy in all respects the missing link between hunters and food gatherers, on the one side, and the tribes of productive economy, on the other. I call them the harvesters. Their food supply is derived from the harvesting of one or a few wild plants, which provide their chief sustenance for the entire year. They are neither pastoral nor agricultural, but base their entire economic system upon the harvesting, not just the gathering, of wild plants.

Harvesting tribes have lived or still live to-day in all five continents. The economic form of the later Palæolithic Age up to the beginnings of the Neolithic period was based on the harvesting of wild fruits and grains, as numerous excavations have demonstrated. In Africa we find to-day scarcely any real harvesters, but the old reports indicate that the harvesting of wild plants and seeds must have played a certain rôle in the economy of many African tribes. Herodotus reports that the lotus lily was harvested by the Egyptians in great numbers, to be dried in the sun, worked into flour, and used for the baking of bread. He describes the root as tolerably sweet and the size of an apple. Kotschy reports from Kordofan that wild rice was harvested to serve for the baking of bread. Schweinfurth specifies three different Oryza (rice) species which constituted the main source of food in tropical Africa without being planted. In the Senegal region harvested wild rice is an important item of merchandise on the market-places. It is in great demand, and sells at higher prices than the rice obtained from agriculture.

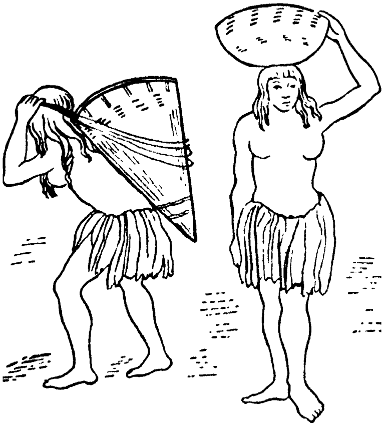
In Australia we find harvesting tribes especially in the far eastern, southernmost, and northerly districts. The bases of subsistence of these harvesting tribes are the wild yam, the nardoo seed, the lily root, the bunya-bunya fruit, the cycas fruit, and others. It is significant that these products are either kept in their natural state or processed into forms more easily preserved, and that they provide the main sustenance for the entire year. They are also widely traded. In some instances treatment of food by fermentation is known, as among the tribes of the Carpentaria Gulf. This process is further developed in Polynesia and among certain arctic tribes. In southern and western New Guinea the harvesting fruit is the wild sago palm, which is the main source of food for many tribes.

The ancient reindeer breeders of Asia were probably originally fishermen and harvesters before they proceeded to reindeer breeding. Even to-day large sections of the arctic regions are inhabited by the Chukchee, the Yakut, and the Tungus, in whose lives harvested wild roots, onions, and garlic play an important part. The Chukchee, especially, gather the roots and the centre portion of *Claytonia acutifolia Willd* in great quantities. This plant is pickled and eaten all year long, up to the next harvesting season. The Polynesians could not have settled on the coral atolls without the existence of the wild bread-fruit tree and the wild coco palm. In the Chaco region of South America the algarroba and the *tusca* are harvested. The Araucanians and the ancient Peruvians harvested the wild potato. In a prehistoric collection from Peru Harshberger found small tubers of this plant, about an inch in diameter, very similar to those of the wild-potato plants still growing on certain Mexican mountains.

AUSTRALIAN
NARDOO PLANT

THE BUNYA-BUNYA FRUIT OF
THE AUSTRALIAN HARVESTERS

After R. Brough Smyth



CALIFORNIAN INDIAN WOMEN
TRANSPORTING WATER AND
GRASS SEED

After Francis Drake

Among the most important North American harvesting foods are wild rice, the piñon nut, and the acorn. These are substituted for and supplemented by additional plants, like the pods of the mesquite tree, the mescal root, the tule root, and numerous wild seeds. East-central Californian tribes mainly subsist on acorns and piñons. This accounts for the fact that their tribal histories do not speak of famine until recent times, as is the case with many hunters and food gatherers, It is, even to-day, a catastrophe for the Indians when, as in 1941, there exists a scarcity of the acorns from the oak-trees of the San Joaquin Valley. These acorns furnish the most important staple food to the members of the Yokuts tribe. The records of this event say : " Before the white man brought his civilization to this area the acorn meats and acorn flour could be kept indefinitely. But now they become frequently grub-infested after only a few months. Almost every Indian camp—and there are still hundreds—keeps a big store of dried acorns in wicker willow baskets."

Perhaps the most important harvesting products of the North American Indian tribes are the wild rice and wild oats of the Lake States region. As early as 1683 Father Hennepin reported in his diary : " In the lakes grew an abundance of wild oats, without any culture or sowing. The old Indians to-day tell many interesting stories in connexion with the rice-fields and that many bloody battles were fought between the Chippewas and Sioux for the possession of the wild rice beds."

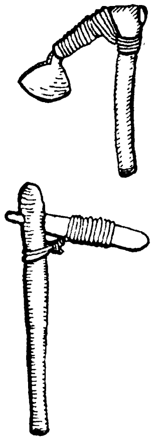
According to legend, the wild rice was " provided by the Great Spirit to keep the Indians well and strong," and they named many streams, lakes, and villages after it. In the Chippewa tongue the month August means " the month of harvesting wild rice " (*Mah-no-nim-e-kay-ge-sis*). The harvesting of the wild rice marks the central point of the economic life of most Sioux and Algonquin tribes of this region. Shortly before the harvest, as Burns reports, the green standing rice-stalks are tied into bunches by the women. This is done to protect the grain from injury by winds or loss to water-fowl, and also to facilitate the subsequent harvesting. When it is ripe it is gathered in canoes, which are pushed through the rice-fields by means of paddles or long forked poles. The Ojibway have legends telling of a horrible time of famine, and of their prayers to the Great Spirit, who finally appeared to the medicine man, telling him : " Look to the seeds sharp as spears. Sweet food is within." This advice was accompanied by detailed directions for the gathering, the hulling, and the parching of the grains. In appreciation of this miracle, the Ojibway hold their annual harvest ritual in honour of the Great Spirit during the rice moon. After the rice has been harvested it is thrashed with sticks, dried in the sun, parched, cleaned, freed from any chaff, and then stored away. The nutlike sweetness of the kernel makes wild rice extremely delicious.

In contrast to the hunters and food gatherers who roam within the tribal territory and live from hand to mouth, these peoples store food during times of plenty, in anticipation of times of need. Their living-quarters are more solid than those of the older acquisitive economic group. They stay at one place, namely near the harvesting field, which comprises often many hundreds of square miles. Whatever types of fruit are harvested by whatever tribes, the shape of their form of economy has exerted the strongest influence upon the development of all their cultural possessions. Most important are their caches and storage houses for the safeguarding of the harvested fruits.

Although they have no planned agriculture, their attitude towards the wild plant is different from that of the food gatherers and hunters ; it is similar to the mental approach of the agricultural peoples. In songs and ceremonies the harvested fruit is celebrated and asked to multiply, for the harvesters are vitally interested in its survival. In western Australia shoots of some wild yams are put back into the soil during the harvest ; and the Ojibway strew some of the harvested rice back into the water so that it may help them towards the next harvest. The Pacific owners of wild coconut palms clear the soil to make room for new shoots when an old tree has been felled.

The harvesting field becomes the centre of tribal life and of social activity. The security of subsistence is responsible for the increasing number of tribal members : the communities are much larger than those of the food gatherers and hunters. Winnebago settlements of three hundred are no exception, and the communities of the Obotos and Wakatimi of New Guinea consist of a thousand people who live off the wild sago palm. In America the wild-rice region has been the centre of expansion of the Sioux and Algonquin tribes. In Polynesia, the wild bread-fruit tree was responsible for the migration of many ethnic waves.

Only these peoples who harvest without sowing, but who harvest in exactly the same manner as do the agricultural tribes, can be regarded as the original inventors of agriculture. In addition, the economy of the harvesters offered the prerequisite for the invention of cattle breeding. The hunters and food gatherers, continuously harassed by the need of the moment, cannot afford a friendly attitude towards their prey animals. In order to survive they have to kill whatever is in sight. The harvesters' main subsistence, however, is guaranteed by the harvesting fruit. They can look upon the wild animal with a different and friendly attitude.



(*Top*) FIELD HOE WITH IRON BLADE

Value: 1500 cowrie shells

Cameroons

After Thorbecke

(*Bottom*) HOE WITH STONE BLADE

New Guinea

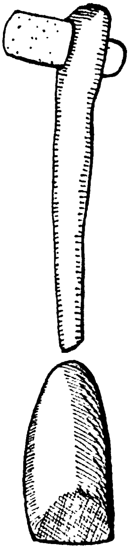
Museum of Ethnology, Cologne

Thus the peoples of the harvesting culture alone have fulfilled the prerequisites for a development of agriculture and the domestication of animals. It is very likely that the arts of agriculture and of stock breeding have developed from this progressive, acquisitive form of economy. Perfected in the course of history throughout suitable regions of the globe, this economy was finally united with the characteristic feature of the high cultures—the tilling of the soil with the plough. The exact place where ideal conditions led to the invention of agriculture cannot be determined to-day, although many indications seem to suggest the southern or central region of Asia.

Since we have certain proof from the early neolithicum of the existence of agriculture we can date back its earliest developments to about the fifth millennium before the birth of Christ. The scientists Heine-Geldern and Menghin have determined the so-called " culture of the cylindrical hoe " (*Walzenbeilkultur*) as the oldest neolithic basis of productive agricultural economy which spread all over the earth from its presumably oldest places of distribution in southern Central Asia, probably China. Its name is derived from a mostly edged stone tool, the cylindrically shaped hoe, a hatchet with a circular transverse section, a sharpened blade, and a round or conical back.

The distribution of this culture is, indeed, of global proportions. Its mighty waves penetrated Asia and Europe, including all regions of eastern and southern Asia, and the Melanesian island groups. Though determined by local conditions, the agricultural economies of the cylindrical-hoe culture were most often combined with the raising or breeding of pigs. This means that if wild boars were obtainable they were caught and possibly bred ; mostly, however, they were kept in hurdles until needed for food. This explains the fact that at most places of excavation the pigs' bones discovered were boars' bones rather than those of domesticated species.

As to the types of earliest plants systematically cultivated by man, it is uncertain whether they were shrubs, bulbs, tubers, or trees. Werth believes that in South Asia the banana-tree may be considered the oldest domesticated plant. According to Brunton, the most ancient cultivated grain was the emmer wheat. It was used in Egyptian agriculture as far back as 5000 B.C. It is hardly possible to determine the age of cultivated bulbs or shrubs by means of prehistoric findings but these findings furnish more accurate facts when it comes to the oldest cultivated grains. Drawings of ears of corn and of cultivated grains dating back to the early Neolithic Age have been discovered; and the excavations at Anau, in Transcaspia, have proved that the cultivation of barley was known as early as 4500 B.C. Among the cultivated plants of the Neolithic Lake Dwellers of Switzerland were the midget wheat, the emmer, the one-corned grain, two species of barley, and one kind of millet. Furthermore, they cultivated peas and lentils, flax, poppy-seed, and a type of grafted apple-tree.



NEOLITHIC HOES

(*Top*) Found at Sigerslev, Denmark
After Déchelette

(*Bottom*) Cylindrical Hoe Stone
After O. Menghin

Whatever the identity of the oldest cultivated fruits or plants may have been, the earliest form of agriculture, still ignorant of the plough, knew only the hoe and, occasionally, still used the ancient digging stick. The name of this form of economy has been derived from the hoe, which usually consisted of a handle with a stone, shell, or iron blade.

Even to-day the distribution of the hoe cultures is on a tremendous scale, with tropical Africa, America, Indonesia, and Oceania as its principal regions. Among the most frequently cultivated plants are bulbs and tubers, like yams, manioc, batata, taro, and potato. Among the grains, maize (corn), rice, and durrha are the most prominent. The number of species cultivated by one tribe is, as a rule, quite limited. One single type of plant usually is so dominant that it alone furnishes the principal basis of economic existence. This does not mean that this principal plant is not supplemented by other produce of lesser importance. Also spices and narcotic plants are cultivated almost anywhere.

If we ask the primitive agriculturists about the origin of their kitchen plants and the age of their economy they will all answer that their ancestors knew plants and agriculture from times unknown, as the ancient myths and sagas prove. The Tupi claim that the manioc shrub emerged blooming from a grave. The Bakairi believe that the same plant was given to them by the *bogadu* fish, living in a near-by river. Gods and ghosts, animals and heroes share the mythical glamour of having blessed humanity with the fruits and plants of agriculture, those all-important gifts from above.

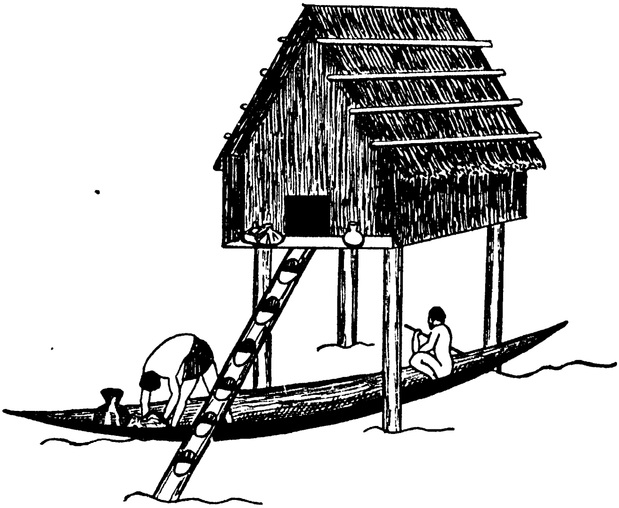
HOEING THE FIELD

Africa

Photo Museum of Ethnology, Cologne

There can be no doubt that the invention of agriculture marks one of the greatest contributions woman has made toward the welfare of mankind. It was woman who in the acquisitive economy already took care of the provision of the family with vegetal food; it was woman who, consequently, put the great new invention of sowing and planting into practice. Of course, the male habit of hunting did not stop with the introduction of agriculture, but continued as in the times of old, even though the chief nourishment of the tribes was taken care of by cultivated plants.

The clearing of a new field, the first planting or sowing, and even the determination of the spot destined to become a field, are often the occasion for elaborate festivities, especially because the whole village population takes active part in agricultural work.



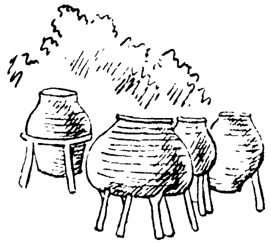
A STORE-HOUSE ON HORO-WHENUA LAKE

New Zealand

After Taylor

When it comes to deciding on a proper spot for a new field the Nad'a of Western Flores (Sunda Islands), for instance, take no chances. They use their indispensable oracle, a bamboo stick called *tibo*, which when allowed to crack in the fire, 'tells,' by the size and direction of the crack, what they should do. They address the *tibos* in the following way : " Tibo, we wish to lay out a new field. If there is something wrong with the path leading to it or if the plot contains anything harmful please tell us by cracking at your upper right ! " If the answer is satisfactory the work is started without delay.

When a tribe of the hoe culture has decided where the new field is to be everybody celebrates by singing and dancing, often under the leadership of the medicine man. Next morning they start out to commence the work. A section of forest, bush, or steppe is cleared ; trees are cut down with the stone-bladed hoe, with the roots remaining in the soil. The cleared-away branches and shrubs are burnt on the spot ; the ashes are raked into the ground to serve as fertilizer. The women have the picnic baskets ready, while the entire male population does the heavy work. When the field is cleared, often after days of hard work, the women take over the planting. At this point, all kinds of magical performances serve to safeguard the growth of the all-important plant. The Nad'a, again consulting their *tibo*, have an especially appealing way of inviting the " souls of the cultivated plants to assemble on the field." " Tibo," they say to the little bamboo stick, " we have now cleared the whole big field. All weeds have been pulled up, all shrubs are burned. It is clean. We now invite the souls to come to this place, laden with rice, so that we may have a rich harvest. We want the beams of the storage-houses to break under the weight of the rice and the floors to cave in. Please, Tibo, promise us such a harvest. If you say yes, crack to your lower left ! " It is now up to the women to put the seeds into the soil.


STORAGE CONTAINERS
Ovambo, Africa
Photo Museum of Ethnology, Cologne

Among the South American Indians, pieces of mandioca stems are planted in the soil so that they may grow into the mandioca shrub. The ripe tubers are harvested as needed, and a new slip is immediately put back into the spot from which the grown vegetable was removed. The plantations are kept in extremely good shape, and many a white man has been impressed by their neatness. A Christian bishop, visiting the native fields near the Xire river, in Portuguese East Africa, remarked : " I thought to be able to teach these black fellows a few things ; now I see how much I can learn from them."

Despite this care, it is still the rule among most tribes of the hoe cultures to abandon the fields after one or two harvests and to move on to clear a new field, although some Congo tribes and also some Melanesians now apply a regular succession of crops. The African sequence may, for instance, be the following : beans on a newly cleared plantation, with spiked millet sown after the harvest. Manioc shoots are planted among the millet ; the growing tubers are usable for about two years. When they begin to lignify a new field is cleared elsewhere and the succession of crops begins anew.

Many primitive tribes of the hoe culture are well aware of the benefits of fertilizing. Some of the East African Bantu use cattle dung for this purpose. Livingstone noticed that the Zambesi peoples fertilized their fields with charred weeds. The North American Indian tribes of New England used fish and shells. The Incas of Peru knew the beneficial effects of guano dug into the fields ; the ancient Mexicans made use of human excrement.

The flower garden as a manifestation of æsthetic taste has its earliest origin in the hoe culture. Vines and blossoms are planted on the rims of the fields or, as among the Papua, between the fruit-trees. These first efforts reached perfection in the floating gardens in the Lake of Mexico and of the legendary Queen Semiramis.

The other branch of productive economy which has since its inception moulded world economy and world history is the domestication of animals and the breeding of live stock, especially cattle.

One might assume that the art of animal domestication and cattle breeding developed out of the hoe culture. This is not true. The oldest data on domestication, as well as the structure of the hoe culture itself, militate against this supposition. The culture and mentality of the herdsmen are diametrically different from those of the agriculturists. The fact that we may find an occasional flock of tamed animals in some present-day villages of the hoe culture does not prove that they have been bred there. They were merely caught in the wilderness and tamed.

Chickens and pigs may very likely claim a special position, because they are non-migratory. Neolithic findings show us that wild jungle fowl and wild boars were kept and corralled in large numbers until the demands of the kitchen necessitated their killing. However, the practice of regular animal breeding encountered among peoples of the hoe culture was adopted from the herdsmen.

The dog, the oldest domesticated companion of man, played the same rôle during the Palæolithic Age. His forefather is the wolf. The oldest centre of the dog's domestication lay in northern Asia. The dog migrated from there to Europe during the ice age. Already domesticated, he arrived in America with the first human settlers.

The breeding of horses, cattle, and sheep developed at places where the suitable wild species were abundant. The high plains within and northward of the central Asiatic mountain chains offered favourable conditions. Flohr and Menghin believe that the regions of western Turkestan up to the plateaux of Tibet were the scene of the development of cattle breeding ; and, indeed, even the present-day type of Tibetan yak breeding has all the ear-marks of a very ancient pastoral culture. The earliest known domesticated species of cattle is the long-horned type, which can be traced back to the wild species of the Asiatic aurox. The domestication of sheep, and later of goats, also seems to have originated in that particular part of the globe.

North of the region of the first cattle breeders, in the Altai Mountains and in the steppes of the Kirgis and Barabas, the culture of the horse and camel breeders found its earliest development. From there it expanded, as an unbroken complex, to the west as far as the steppes of south-eastern Russia and to the Caucasus ; in the East it reached the Gobi Desert. Although horses and camels were originally used as beasts of burden and as providers of milk, no independent economic form could possibly develop from the unstable form of life of these tribes, who were sometimes even unable to provide enough food for their animals. Consequently, we find that the breeders of riding animals live practically without exception in symbiosis with tribes adhering to the economic forms of harvesting, of agriculture, and of cattle breeding. There can be no doubt, however, that the breeding of horses was customary on the plateaux of Central Asia as early as the fifth pre-Christian millennium—that is, towards the end of the European ice age.

The culture of the cattle-breeding peoples proved to be of world-embracing influence, whether actively through the migration of the tribes, or passively through the mere adoption of their economic form by others. Archæological discoveries, especially those described by Pumpelly, have thrown much light on the structure of the oldest cattle-breeding cultures. The findings at Anau, near Ashabad, in Transcaspia, disclosed at a forty-five-foot depth a lower layer with very well preserved remnants of a cattle-breeding culture dating back to about 3500 B.C. Since evidences of barley and wheat as cultivated plants have been found in equally ancient habitats it may be assumed that the Anau culture represents already a blending of the agricultural economy and the cattle-breeding economy, and that the latter is of an even older age.

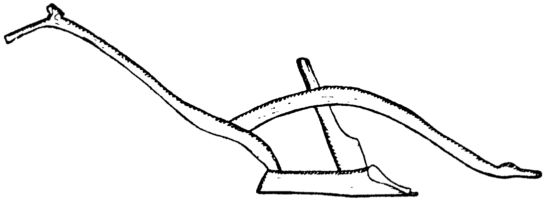
The diffusion of the cattle-breeding cultures from their original places of development took place by active migrations, chiefly in a southerly direction. Europe and Eastern Asia, although adopting the principles of cattle breeding, did not take over the whole cultural complex of the herdsmen's culture. The southernmost representatives of the Asiatic cattle breeders are the Toda in the Nilgiri Hills of southern India. The main stream of the herdsmen's migration went to Iran, to Mesopotamia, to Syria, and to Africa. In Africa proper the herdsmen spread from the Northeast to Egypt and, in fewer numbers, north across the continent to the Canary Islands. Their strongest waves of migration went to East Africa and to the south, avoiding tropical Central Africa. The animals bred were principally cattle, serving as both beasts of burden and mounts.

Thus, the main African form of economy is the breeding of cattle, while Asia favours the breeding of sheep and yak. As a rule, the herd is considered a manifestation of wealth which should not be diminished by slaughterings without urgent reasons. Consequently milk, hair, wool, and dung are the principal products, with less emphasis put on meat.

The two main branches of productive economy, agriculture and animal breeding, developed out of the economic form of harvesting. They met and merged in vast regions of the globe. Only in their final merger were all prerequisites for an economic conquest of the earth achieved. Yet if it had not been for the invention of the plough the utilization of immense spaces of the earth would not have been accomplished to make possible the feeding of ever-growing populations. The invention of the plough and the harnessing of animal power—mainly cattle and, later, horses—to pull it enabled man to lay out larger fields, suitable as bases for a truly productive form of agriculture. The plough itself is an application of the mechanical principle of the hoe and of a peculiar spade form of the digging stick. Its earliest evidences go back to the third millennium B.C. It was known to the farming peoples of the Danube region with their so-called culture of 'band-ceramics.' During the same epoch it was already used by the Indo-European tribes.

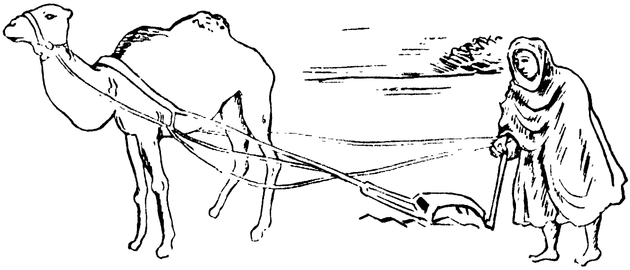
The first development of the plough culture occurred at but one time in history and at but one place before it spread to other regions of the globe. The place of its first inception was, most probably, the region of the high cultures of Mesopotamia and Egypt.

In its most ancient form the plough consists of wood in the shape of two forked branches, although even the oldest Neolithic specimen indicates the use of a ploughshare fashioned of stone. This is not surprising, since the hoe itself was equipped with a blade of stone or shell. Even to-day primitive wooden ploughs are still in use in some regions, for instance in the east and south-east of Europe. The frequent supposition that the invention of the wheel or of the cart had anything to do with the invention of the use of the plough is not correct. Originally the plough was used without a wheel. Even to-day the ploughs of the Batak of Sumatra and of the Chinese and Japanese are not equipped with wheels.



PRIMITIVE PLOUGH

The plough was unknown in ancient America, probably on account of the non-existence of draught animals. In the American high cultures of Mexico and Peru the economic form of the hoe cultures developed into horticulture and the building of terrace-shaped fields.



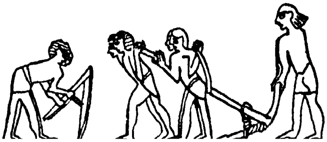
WOODEN PLOUGH

Kabyles

Photo Museum of Ethnology, Cologne

The most characteristic features of the plough culture are the systematic fertilizing of the soil and the development of intricate irrigation systems. Not before the end of the eighteenth century did sweeping innovations modernize the ancient plough. Then finally the wooden parts were replaced by iron or steel. Several ploughs were combined in a single unit. Later ploughs came to be operated by mechanical power, such as steam-engines and motors.

Thus ends the saga of economy, the story of the development of one of the most important forces which make it possible for men to live in ever-increasing numbers on the earth. The plough and the knowledge of cattle breeding have not only enabled the peoples who own the great global granaries and live-stock resources to feed themselves, but they have also made them trustees of the needs of modern mankind as a whole.



MAN-DRAWN PLOUGH
Ancient Egypt (El Kah)
After Treidler-Herodot

CHAPTER FIVE

Invention and the Early Trades

GOETHE SAYS IN *Faust*: " No created mind can penetrate the innermost sanctum of nature." In recent years this has perhaps become no longer true. Our ability to photograph cellular growth and our newly acquired knowledge of the forces controlling the universe have enabled us to lift the veil from some of the fundamental secrets of creation to such a degree that warning voices like Winston Churchill's express the great twentieth-century fear of our very progress : " The Dark Ages may return, the Stone Age may return on the gleaming wings of science, and what might now shower immeasurable material blessings upon mankind may even bring about its total destruction."

NAVAHO WOMAN WEAVING RUG

By courtesy of the American Museum of Natural History, New York

Were these dark ages really so ‘ dark ’ ? The difference between them and our time lies in the attempt of modern man to elevate himself to the rôle of master of the universe. In bygone ages nature was the omnipotent master of man, who derived his knowledge and his early skills from the phenomena be observed in his natural surroundings. He was the apprentice of the greater forces around him. But even then the functions of his brain enabled him to create spiritual and material possessions worthy of the term ‘ Homo sapiens ’ and completely out of reach of the ingenuities of the animal kingdom.

Elephants have been observed ripping branches from trees with which to strike pursuing dogs. We are familiar with the achievements of the beaver, that master-builder. We know of the tiny American wasp that uses a pebble, as a regular tool, to pound the protecting soil over the pit containing its eggs—but are these animal activities evidences of planned thinking ? Are these intelligent uses of natural objects actually inventions ?

Shrewd as they are, these animals take their tools just as nature provides them. They remain ignorant of man’s art of *manufacturing* things out of the materials of nature by giving them new shapes and new possibilities of application. The animals may be users, but they are not inventors.

Since the ice age man knew how to transform the raw materials he found into tools that raised his living standards to a level far above that of his lowly brethren, the animals.

No Aristotle, Galileo, Volta, Edison, or Bell of the primitive past can be individually recognized and honoured as an early inventor. No one man’s ‘ brainstorm ’ was responsible for the first stone axe, the first woven basket, the first windbreak, or the first fur coat. All these inventions were links in a chain forged by the gradual perfection of the experiences of long generations of unsung inventors. They were the result of many different combinations. We have no right to assume that every prehistoric individual was a genius who invented for himself whatever he needed.

No commonplace is less defined than the saying, “ Necessity is the mother of invention.” Climatic conditions, psychological preparedness, and migrations of ideas and of peoples were among the decisive factors that promoted or hampered the diffusion of technical knowledge. Snow-shoes and sledges could not be invented in the jungle ; fans and ore-melting furnaces could not originate in the ironless arctic. A Bushman genius, however bright, was not ready to work out the loom or the storage-house ;

the Australian aborigines could not make felt or conceive of sleeping in a hammock. Although the possession of these skills would have meant improvement in their living standards, their minds were not yet ready for them. Even if taught these secrets they would abandon them quickly, just as the primitive Pygmies look down upon the agricultural Negroes around them.

The independent invention of a cultural element or the adoption of an invention from another culture have one prerequisite in common : that a psychological preparedness must exist in the mentality of the prospective adopters ; otherwise a new cultural possession will be neither invented nor accepted. Independent invention and adoption are distinguished from each other by the simple fact that invention is the result of creative process, while adoption indicates merely a receptive nature. A few examples may serve to illustrate this point. The structure of the Japanese culture, for instance, was such that Japan adopted many cultural elements from Western civilization—even the most modern weapons—while the cultures of, let us say, the Bushmen, the Australians, or the Fuegians never would have been ready to accept such inventions. The gap between the two cultures is too great.

On the other hand, primitive cultures have accepted some elements from foreign civilizations without understanding their original meanings. In Africa a safety-pin may be an ear ornament ; a gramophone a materialized choir of ghosts. A European watch may be an amusing pattern for circular ornaments.

Another point which is worth stressing in regard to the diffusion of cultural elements is the difference between invention and modification, the first being something entirely new ; the second, merely an improvement of an older invention. It is often very difficult to determine the original place of an early invention. Diffusion has taken place on such a tremendous scale that we find to-day, in entirely different regions of the world, cultural centres where not only tools, houses, and objects of daily use are completely alike, but also where they are complemented by the same religious, economic, ethical, and social conceptions.

Most technical possessions of our modern civilization in one way or another have their roots in the ancient inventions reaching back in an unbroken chain to the dawn of time. Although many of the old techniques have been outmoded by perfected manufacturing processes, a great number of man's earliest possessions continue to be used to-day in the same manner or with but little change ; others were used by primitive man for centuries before the white man learnt about them.

Among the discoveries and inventions of North and South American Indians made before the arrival of the white man Nordenskiöld listed especially the recognition and utilization of food plants like the maize, the manioc, the potato, the sunflower, the artichoke, and the bean. The Indians domesticated the llama, alpaca, guinea-pig, musk duck, and turkey. Cocaine as well as cotton was known to them. The hammock is their invention, as is the rubber ball, and a method of manufacturing waterproof fabrics. They brewed deadly poisons like curare and obtained poison gas from cayenne pepper, for use as a weapon of war.

Long before Coué and his " every day, in every way," the medicine-men of the jungle cured their patients by auto-suggestive methods. At a time when white surgeons lost 90 per cent. of their patients in attempts at trepanation North African natives knew how to open the human skull with complete safety. They were equally skilled performers of the Cæsarean operation. Centuries before the Nobel Prize was awarded to Wagner-Jauregg for his method of treating general paralysis of the insane, caused by syphilis, with inoculations of malaria East African natives sent their syphilitics ' into the swamps ' where they contracted the beneficial fever.

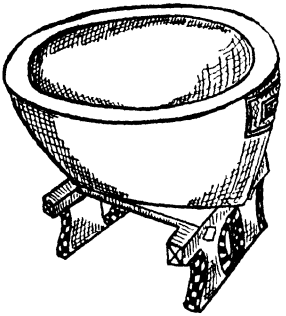
And, corresponding to our manifestations of ' utter luxury,' native telephones built from pumpkin shells and rat skins are an old African possession. Eskimos telephone with skin-covered containers over distances as great as one hundred and twenty-five feet. Air-conditioning towers of the type described by Marco Polo as " artificial lungs, shaped like squat staples," are still commonplace in the Bahrein of to-day. Modern dark spectacles have nothing on primitive eye-shades. In the Arctic split bones or pieces of wood protect the eyes from snow-blindness ; woven eye-shades of all shapes are common in Melanesia and Polynesia and in South America, with thin black-felt veils as their Tibetan counterparts.

Hundreds of generations of artisans laid the foundations for our modern material luxuries when they went about manufacturing the first objects of comfortable living from stone, wood, bone, plant fibre, and animal skins. A study of at least the major early industries is interesting indeed, because it tells the story of the beginnings of the things of which we are proud to-day.

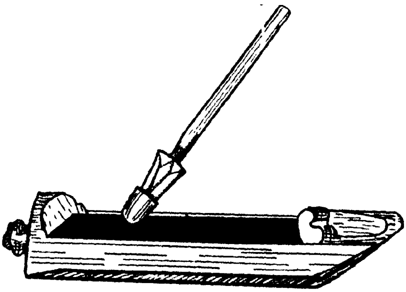
When the layman strolls through the collections of any ethnological museum he is confronted with a multitude of objects manufactured from materials of such diversity that he may give up the attempt to answer for himself the question that might have inspired his visit: " What were the earliest handicrafts known and what materials were used by the oldest craftsmen of human history?"

The objects accidentally preserved through the millenniums do indeed easily lead us astray. Too often we forget that only those materials whose very structure made them withstand the decay that comes to everything made of 'dust,' be it the flesh of man or the fibres of plants, could survive the ages. Long before the Stone Age another working material, wood, was as abundant as it is to-day and as subject to decay. From the brethren of prehistoric man, from the now extinct Tasmanians, and from the living Australians and their food-gathering relatives of other continents, we can easily learn that at the dawn of time the Age of Wood prevailed. If we assume that the Ages of Iron, of Bronze, and of Polished Stone lasted about three thousand years each we can safely state that the preceding Age of Chipped Stone and its probable forerunner, the Age of Wood, extended over longer periods. This does not mean that the functions of wooden tools and implements were in later eras completely replaced by other materials. The contrary is the case, as our modern furnishings show. It only means that wood was the earliest working material available and the easiest to tackle with the existing tools.

'LIL LIL' CLUB
Western South Wales, Australia
After F. D. McCarthy



WOODEN FOOD-BOWL
Island Truk (Carolines)
Museum of Ethnology, Cologne



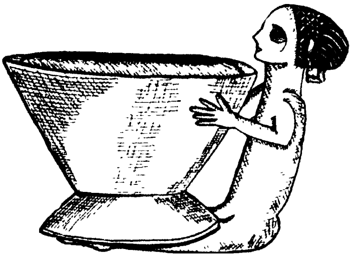
WOODEN TROUGH FOR CRUSHING CASSAVA LEAVES
After G. Tessmann

The universal use of wood dominated the material possessions of the oldest man, just as is the case to-day in many regions. Since there were available no adequate tools to shape the wood as nature furnished it into pieces of finer carpentry, the working of the more pliable bark assumed great importance, especially when it came to building larger objects like windbreaks and canoes. Shells, animal teeth, bones and crude stones helped to fashion the desired pieces. It is astounding to see what primitive man could and still does achieve in his woodwork without the benefit of metal blades and nails.

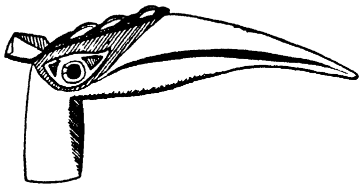
HEAD-SHAPED CUP
Wood
Southern Congo
Museum of Ethnology, Cologne

Many houses of primitive man, even in higher cultures, are joined together by binding. Bark objects are either stitched together with sinews or fibres, or glued and cemented in a surprisingly durable fashion. Large wooden containers, like signal drums or boats, are fashioned from solid trunks and hollowed out by fire.

About the oldest wooden tool of man is the digging stick, his indispensable helper on daily food-gathering expeditions. It is a simple wooden branch with a pointed end, occasionally forked and often hardened in the fire. Derived from it is the wooden spear which served in the hunt, the other early food-gathering activity of primitive man. The points of wooden spears are hardened over a flame to such a degree that they are sometimes superior to those of flint-stone or even metal. The Asiatic method of soaking bamboo spears in oil and hardening them in hot ashes



WOODEN BOWL
Southern Congo
Museum of Ethnology, Cologne



CARVED WOODEN CLOTHES RACK
South Seas
Museum of Ethnology, Cologne

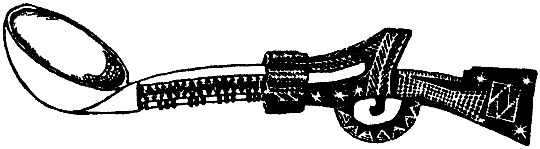
results in metal-hard points. During recent uprisings in the Far East such spears have effectively competed with the white man's weapons.

Derived from the parrying stick that warded off a blow, the shield is a later addition to the family of wooden implements. It has undergone many variations of shape and material—as, for instance, the African leather shields. Another multi-shaped weapon is the wooden club, used by all primitive tribes in scores of forms from the simple root or branch to the ceremonial dance clubs of the South Seas, which are painted and engraved and trimmed with tassels, fringes and feathers. Even the Australians have specimens of graceful and efficient shape, decorated with a multitude of geometrical engravings. Their boomerang or ' come-back-club ' makes use of a complicated physical principle ; with each of its ends on a different plane, it utilizes the principle of the screw.

Most of the primitive household gadgets of wood are not very different from our own. Among them are spoons and ladles, bowls and plates, and the like. Even wooden forks occasionally are used, although in limited areas and not as an ordinary eating tool, but as a ceremonial object. In the three-spiked form it is used among the cannibals of the South Seas for the handling of human flesh. Finger-bowls, trays, and boxes of redwood belong to the equipment of the Californian Yurok household. Head-rests, stools, and large storage-boxes are found among large groups of peoples on all continents, and smartly carved African Tikar sandals have all the ear-marks of elegance and can be compared very favourably with our modern beach models. The magnificent house posts, dance masks, drums, and household containers of Polynesia are all carved without the benefit of metal tools, the only technical aids being shells, coarse fish skins, sand, and pumice. Since the African natives knew about the smelting of iron even before the white man, they have achieved, in their famed bowls, house posts, furnishings, and idols, such perfection of form and workmanship that the native art academies of the jungle nowadays attract students from the white world.

Although the techniques of wood manufacture became more clearly differentiated in the high cultures, especially with the addition of the plane and the grooving of fitted parts, they did not change in principle. The primitive wooden animal trap, bow and arrow, and countless other wooden articles have not only inspired imitation by the white man but have also served often as ' blue prints ' for their later manufacture in other materials.

The most easily managed wooden raw material is bark. Bark built the earliest home of man, the windbreak ; bark makes the baskets and containers of many tribes ; it is to some people the most important material of all. The entire material possessions of the Indians of Labrador depend, except for animal skins, on two working materials : bark and wood. They could not obtain the skins of their game animals without the help of their birch-bark canoes and their wooden sleds. Practically their entire household equipment is fashioned from birch bark, neatly 'tailored' in geometrical fashion. This bark is cut with beaver teeth and stitched together with split pine roots, animal sinews, or leather strings. Glues of resin make their vessels watertight, and scraped ornaments depicting animal figures, mythical characters, and geometrical shapes decorate them in a pleasant effect of contrasting dark and light brown. Thickened blueberry jam, bear grease, and the famed pemmican are kept safe from insects, dirt, or moisture in covered containers which are equally sturdy and pretty to look at.

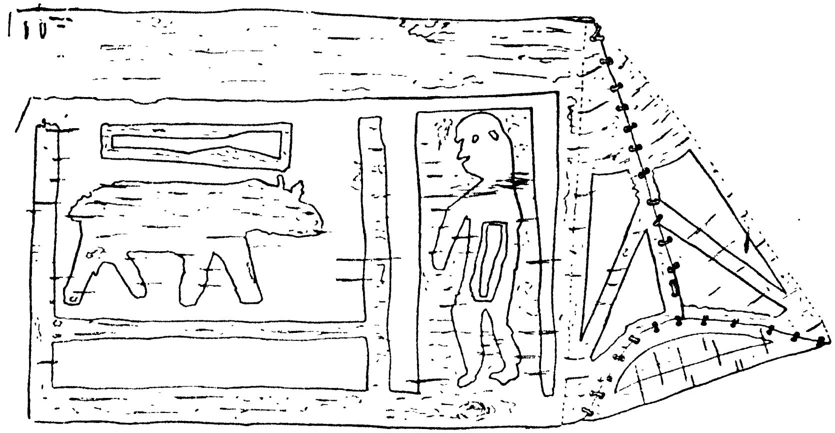


WOODEN LADLE
African Gold Coast
Sammlung für Völkerkunde der Universität Zürich

BARK BASKET
Bathurst Island, Australia
After F. D. McCarthy

Perhaps the most important use of bark is the transformation into bark cloth by the process of soaking and pounding, which results in a smooth material fit for clothing—a substitute for woven fabrics. This type of bark cloth, sometimes used in the more advanced cultures but unknown to the hunters and food gatherers, is manufactured in Africa and Madagascar. Its most important centres of distribution are in Indonesia and Polynesia, where it is known as *tapa*. It may have been from Indonesia and Polynesia that the knowledge of it migrated to North and South America. It was known to many prehistoric peoples of Europe and Asia.

Tapa is manufactured from the bark of trees containing bast, such as the bread-fruit-tree, the fig-tree, and the mulberry-tree. After the bark has been stripped off the trunk it is softened by soaking and then pounded into a light, pliable fabric with the help of special clubs, beaters, or mallets. The finished product is finer in texture than many a product of the loom. In Polynesia it is decorated with multicoloured ornaments of singular regularity and beauty, sometimes painted, sometimes printed on with stencils of wood or bamboo. In Africa the bark mallet is often made from a part of an elephant tusk. Pulverized redwood is beaten in as a dye. The main use of bark cloth is as a material for wearing apparel. The North-west American Indians use cedar bark, which they loosen from the tree with bone scoops and pound with fluted bone beaters. Many of their painted dance blankets are manufactured from cedar-bark cloth, and the bark fibres are often woven into their blankets made chiefly of dog's and goat's hair.



ORNAMENTED PEMMICAN BASKET OF BIRCH BARK

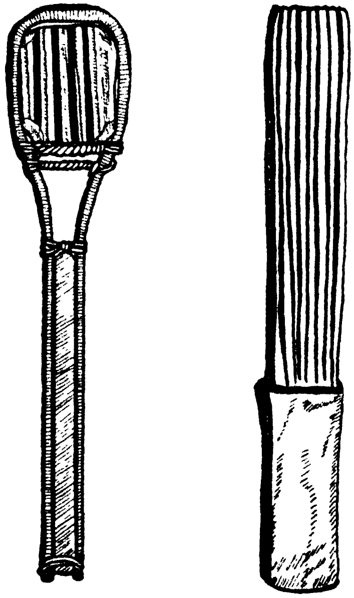
Montagnais-Naskapi, Labrador

Collection Julius E. Lips

The method of fashioning bark cloth from beaten bast has influenced, if not inspired, the Chinese invention of paper, the earliest samples of which consist of mulberry bast with added plant fibres. It also is responsible for the invention of the Egyptian papyrus, a product obtained by the pounding and gluing of reeds.

Equally ancient as the use of wood and bark for the fashioning of man's oldest belongings is the universal utilization of bone, horn, shells, and animal teeth as earliest tools. In the older Palæolithic Age bone knives, shafts fashioned from horn, scrapers and planes of shell were abundant. Entire prehistoric periods have been named after the dominant bone tools of these eras. Sockets of bone joints served as containers for paints and greases. The tooth-studded jaws of the cave bear made effective weapons. Harpoon hooks, awls, spoons, scrapers, and needles were fashioned from bones in exactly the same manner that primitive tribes of to-day utilize the same material for the same purposes.

MALLETS FOR THE MANUFACTURE OF BARK CLOTH

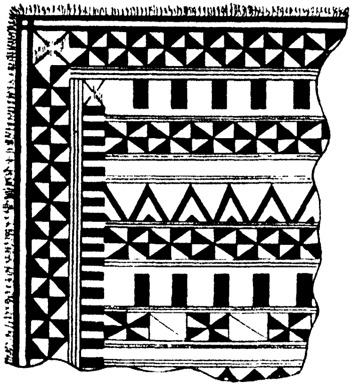


Central Celebes
After Nordenskiöld

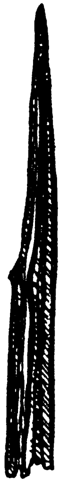
Santa Cruz Islands
Museum of Ethnology, Cologne

Bone awls serve to-day's Australians in the manufacture of coiled baskets ; pig's ribs are ' needles ' on the Santa Cruz Islands ; fur scrapers made of thigh-bones are a universal tool of the American Indians from California to Labrador. Bone knives are customary in the jungles of eastern Bolivia, with a monkey thigh-bone serving as a handle and the tooth of the *hochi* hare as a blade. The Canadian hunters have a similar tool, with a beaver tooth at the work end and a handle of wood or bone. Tools of this type have not undergone any changes in appearance ; they are used to-day as they have been since the dawn of time.

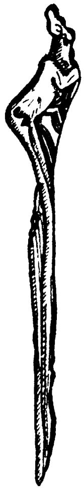
The chipped-stone implements among the earliest Palæolithic findings show such purposeful workmanship that we must assume that even they were the results of previous periods of development. The word ' Palæolithicum ' itself (from the Greek *palaios*, ' old ' ; and *lithos*, ' stone ') stands for the conception of the age of the ' old ' or chipped-stone implements, while the younger ' Neolithicum ' is the period of the ' younger ' or polished stone tools.



TAPA (BARK CLOTH)
Fiji Archipelago
Museum of Ethnology, Cologne

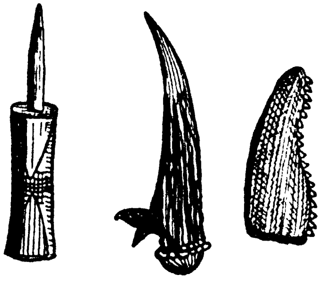


WOODEN
SPEAR-POINT
Clacton-on-Sea
Early Palæolithic
Age
*After Hazzledine
Warren*

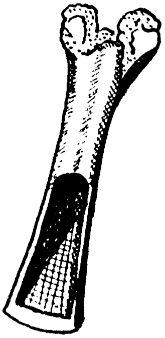


PALÆOLITHIC
BONE DAGGER
*After
Lartet-Christy*

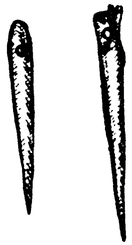
BONE TOOLS



Bone Tools of the Fuegians
After K. Weule



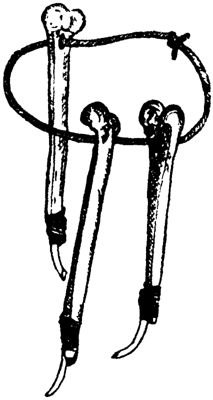
Fur Scraper
(Caribou Leg-bone)
Montagnais-Naskapi
*Collection
Julius E. Lips*



Neolithic
Bone Needle
and Awl
After O. Menghin

The oldest unpolished stone implements show shell-like chippings of great diversity. Their purpose can easily be determined by the shapes man knew how to give them. They were scrapers, scorpers, blades, and the like, whose wooden handles, shafts, etc., could not survive the ages. Arrow points of stone are less ancient.

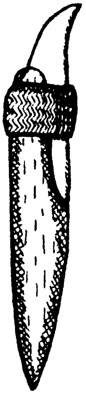
Stone knives are used to-day by many Eskimo and Indian tribes. They may be hafted, with the blade inserted in a wooden handle and tied or glued in place, or simply made with a smoothed end of the stone itself. The California Indians use unhafted flaked knives of quartz or obsidian for skinning large game and smaller blades of the same stones set in wooden handles for their general kitchen use. The ancient Aztecs used obsidian knives for their religious sacrifice of human beings. The stone knives, still used by many present-day races for their ritual circumcisions, are a surviving reminder of the age of this custom. Stone axes have been found in archæological excavations in South America. Stone saws of the type used by the prehistoric Lake Dwellers of Switzerland are still in use among primitive tribes. These consist of a wooden base with inserted stone splinters for teeth. Borers of stone are still customary even in the Indian high culture. Stone hatchets are joined to straight or curved wooden handles by cement, putty, or resin, or tied to the shaft with strings.



KNIVES KNOWN AS HIRAZI OR AIKUDIN

Sirione Indians, Eastern Bolivia

After R. N. Wegner



COCONUT OPENER

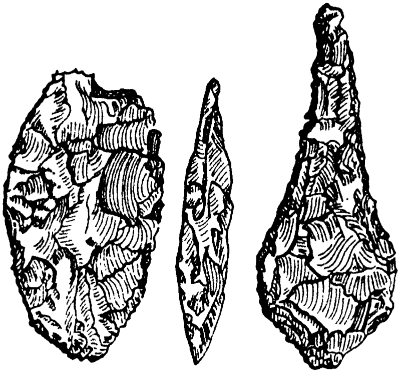
Wooden handle with Tridacna-shell blade

Bismarck Archipelago

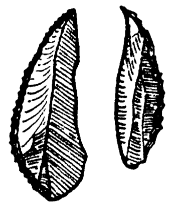
After Frobenius

Another important utilization of stone for household implements are the slabs and grinders on which primitive housewives all over the earth chop and mince their grains and vegetables. One large stone serves as a base, with a smaller, round stone as a pestle. From the harvesting tribes of North America to the agriculturists of Africa and the Pacific Islands, such slabs and mortars are in general use.

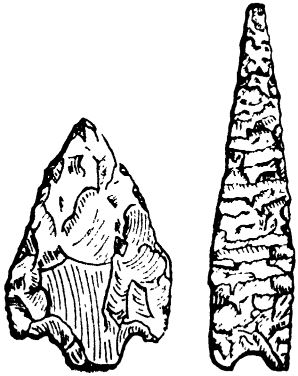
Some tribes even manufacture decorative trinkets of allure from stone. The Tuareg and the tribes of the western Sudan have black marble bracelets of great regularity and beauty.



CHIPPED-STONE TOOLS
Early Palæolithic Stage
After O. Menghin

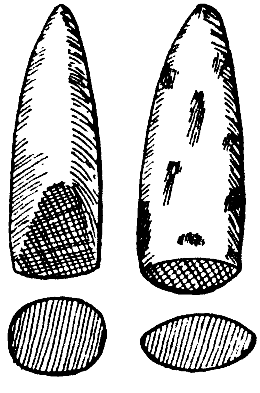


STONE POINTS
Younger Palæolithic Stage
After O. Menghin



SPEAR-POINTS

Early Palæolithic Stage	Younger Palæolithic Stage



NEOLITHIC TOOLS

Cylindrical Hoe	Axe-head of Flint-stone

After O. Menghin

The people of Oceania are famed for their precious and artistic clubs of basalt, nephrite and other valuable stones. These implements are often decorated with carved images and serve as symbols of chieftainship or sovereignty. The dark-green nephrite sceptres of the Maori are among the most artistic show-pieces of our modern museums.

Among the handsomest pieces of native craftsmanship which we can admire during our strolls through ethnological collections are the multi-formed woven bags, baskets, and household articles which even the most primitive tribes turn out with great neatness and accuracy. Although the art of intertwining, interlacing and braiding plant fibres is known all over the world, its centres of perfection are in Africa and the South Seas. The art appears sporadically in the arctic regions, where the lack of suitable materials has led native manufacturing skill into other channels.

STONE KNIFE FOR HUMAN SACRIFICES

Mexico

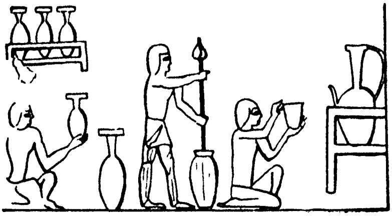
British Museum, London

Braiding and interlacing are two of the oldest handicrafts known to man. The different stages of their development can be followed easily. They lead from the simple joining of palm leaves, bast strings, and grass blades to the final development of the loom and the multi-textured materials the loom produces. Although we speak of basket 'weaving,' this term must not be confused with the art of the loom, which appears only in advanced cultures, while braiding and interweaving are known everywhere.

The simple art of joining plant fibres into regular patterns to produce the many containers, mats, sieves, and other gadgets characteristic of basketry does not require the use of tools other than an occasional awl or needle of wood or bone. About the simplest method of making a fan, for instance, is the mere interlacing of the pinnated parts of one single palm leaf, which makes a pretty and sturdy article. It is used by many tribes of the Pacific Islands and South America.

But by far the most important braided or interwoven objects are the many and varied containers which primitive man uses to collect and store his food and belongings. The very term 'food gatherers' implies that even the earliest tribes needed containers in which to gather and to carry home whatever nature gave them. It is, therefore, not surprising that these peoples put great emphasis on light weight, sturdiness, and efficient shape for their woven containers.

Australian baskets are either simply interlaced or show a quite intricate application of the so-called spiral coil, developed from the sling technique. Reed or grass forms the coil, round which the bast fibres are wound, and the individual coils are then laced together. Most bags are equipped with strings slung round the shoulder to keep the hands free for the digging stick. Some tribes, like the natives of Arnhemland, make twined baskets decorated with interwoven 'X-ray' patterns in which human figures, lizards, crocodiles, and goannas predominate.



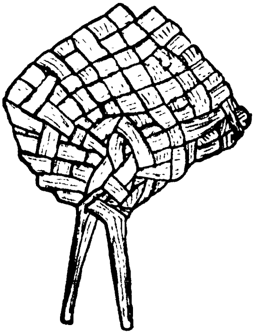
EGYPTIANS HOLLOWING OUT STONE VASES

Relief in Thebes, 650 B.C.

After Steindorff

MORU WOMAN GRINDING DURRHA

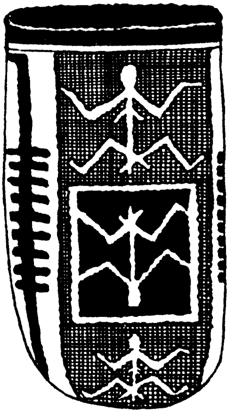
After Bernatzik



FAN, WOVEN FROM COCO LEAF

Santa Cruz Islands

Museum of Ethnology, Cologne

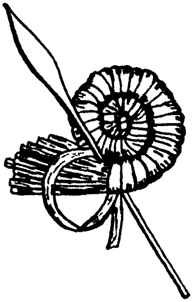


TWINED BASKET

Alligator river, Arnhemland, Australia

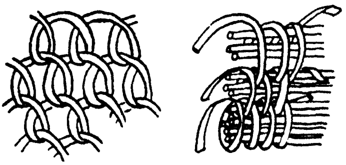
After F. D. McCarthy

The African Wambutti Pygmies have a practical method of weaving a basket on the spot where they have killed and cut up a piece of game. In order to carry it home conveniently they immediately set to work to make a handsome basket, more than one yard high, which is fashioned exactly after the pattern of their beehive hut. When the basket has reached the desired dimensions they pull the ' hut ' out of the soil, turn it over, fill it with the meat, and carry it home.



SAMPLE OF SPIRAL-COIL TECHNIQUE WITH AWL

After Schmidl

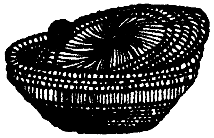


SPIRAL-BRAIDING TECHNIQUE

Tierra del Fuego

After G. Montandon

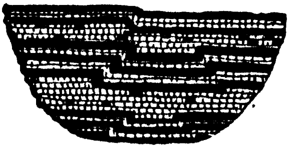
The Yahgan of Tierra del Fuego know four different kinds of basketry. Their different containers are known by the names of the applied techniques.



BASKET FROM YORUBA

Africa

Lindenmuseum, Stuttgart



YUKI BASKET

California

After A. L. Kroeber

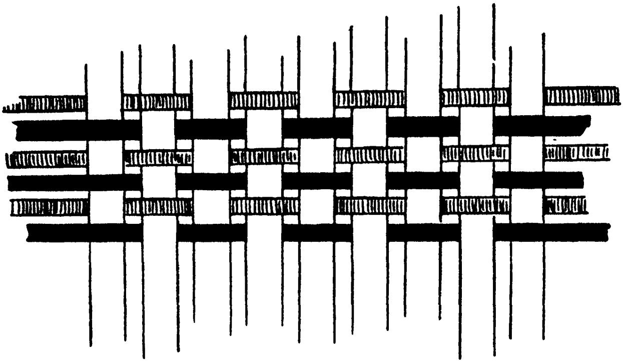
Among the American Indians the art of basketry reached early heights of perfection—so much so that their woven objects often replaced things which other peoples fashioned of wood or clay, like plates, trays, bowls, cooking pots, and baby cradles. The California Indians especially—among whom basketry is " unquestionably the most developed art "—produce tools and containers of exquisite shape, smoothness, and stability, most of them decorated with geometrical ornaments achieved by the addition of multi-coloured materials. While among these tribes the ancient coiling technique is often entirely dispensed with, especially among the northernmost ones and the Yurok and their neighbours, the most characteristic examples of Maidu basketry remain coiled. The foundation of the coils is always three-rod, with peeled willow or unpeeled redbud as the chief materials. In the working process bone awls or sewing splints are used to facilitate the anchoring of the work-fibre between the coils.

The Maidu baskets are mostly two-coloured, brownish-red and white, and measure up to the standards set by the other California tribes, although they are not quite as perfect as the Pomo and Yakut containers. One of their most interesting objects—the seed beater, which is used in the processing of their wild harvests—is constructed of wicker. Tule mats, universal in California, are their favourite pieces of ' furniture,' serving as " seats, bed, camp roofing and doors."

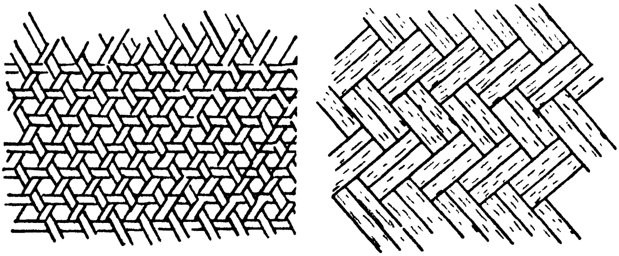
The following variety of Yurok objects listed by Kroeber gives at least an idea of the almost boundless use of basketry products among these tribes : cooking baskets for acorn mush, high round vessels used as general receptacles round the house, storage-baskets of three feet or more in diameter, conical baskets for carrying loads, patterned smaller baskets for gathering wild seeds, seed beaters of coarse openwork, plates and trays of all sizes, decorated small bowls, tobacco baskets often covered with deer-skin, hoppers for the slabs on which acorns are pounded, dance baskets, women's caps, baby carriers. This list is by no means complete and could be supplemented by the countless basketry objects manufactured by other tribes, especially the Pomo, the Yuki, and the Lassik. Very frequently used is the method of overlay twining. Over a foundation of hazel shoots or conifer roots each weft strand is faced by a coloured one, to produce designs.

Other American Indians, like the Apache, weave baskets of such firmness and fineness that they are practically watertight. For their manufacture, the Apache woman collects willow withes and keeps them in a moist spot to preserve their flexibility. When used they are split and scraped and woven into a circle, with stiff split sticks for a bottom. To make the last openings disappear, the basket is frequently interwoven with buck-skin strips. The resulting vessel is a wide-mouthed storage-jug. The *tus*, or water-jug, gets an additional inner and outer coating with warm piñon pitch. The average size holds about five gallons of water.

Among the most important objects invented by the Indians of South America is the so-called tipiti tube press, used for pressing the juice out of the mandioca pulp. Intricately woven of diagonal fibres, it contracts when pulled at both ends, thus extracting the juice completely from the pulp. The Xingú river region is rich in many other products of basketry, besides the tipiti. These products range from the large baskets of interwoven palm leaves to tiny quivers for blowing darts, fire fans, covered boxes, and large-burden baskets.



PATTERN FOR CROSS-WEAVING
Dutch East India
After Lamster



BASKET-WEAVING TECHNIQUES
Dutch East India
After Lamster

Other centres of basketry are in Indonesia and the Pacific Islands. Many techniques are known in this region, from the ancient coiling of liana and rotang fibres to woven sandals and fans and fine carrying baskets. In the Santa Cruz Islands, the latter, for instance, are overlaid with ornaments and tassel trimmings, and their appearance is indistinguishable from products of the loom, although they are hand-plaited without any other technical aids than delicate fingers and extreme dexterity. The ' netting-without-a-knot ' technique is used with equal skill for basketry and produces bags of great strength and flexibility. Pacific cooks make use of hand-woven tent-like structures which they drag over the open fire in the event of a cloudburst. The braided mats of the South Seas are too well known to be mentioned here at any length.

The basketware of Africa is world-famed and of such great variety that many volumes have been filled with descriptions of their shapes and ornamentations. From the huge fences of interwoven grass to the burden baskets of smooth liana braid ; from the thousands of household containers, bowls, sieves, and trays of raffia to the tiny square sun roof which protects the sleeping baby, human craftsmanship and imagination have produced thousands of forms so efficient and so beautiful that only a trip to a museum can provide even an idea of their unsurpassable artistry. In the Cameroons and elsewhere whole houses may be roofed with finely woven mats, and entire village streets are screened off with sturdy woven walls.

Another use of the plant fibre is in the form of cords or twine, binding materials which play a paramount rôle in many primitive cultures. Snares and nets consist of strings ; wooden poles are tied together to build a house. Whether the plant fibres are obtained after complicated rotting processes or twined and twisted together in their original state, they are among the most important materials of most primitive cultures. The shark snares of the Santa Cruz Islanders are strong enough to hold the huge prey.

A charming tale of the Pangwe explains the fact " that the animals enable man to kill them " by their failure to destroy man's plantations, which supply the fibres used in manufacturing fishing cords, snares, and nets. The Tikar of the Cameroons cultivate a hemp species that furnishes the thread for their sturdy tows and nets, and their own cotton furnishes the raw material for the finely braided bands on the aprons and baskets used by their women.

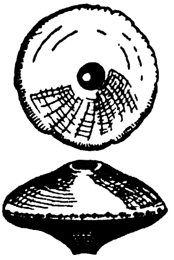
Even human hair may serve as a material for strings and braids. The Australians manufacture hair bands of human and opossum hair and braid belts and necklaces of the same material. No Australian mother-in-law has the right to refuse to her daughter's husband the privilege of claiming her ' crowning glory ' when he wishes to manufacture from it some strings or braids. The New Caledonians decorate their chieftains' caps with long strands of braided human hair, and the natives of Assam trim their spears with similar cords. On the Melville Islands belts, bracelets, and headbands, often interwoven with feathers and plant fibres, are valued pieces of 'jewellery.' The native warriors hang balls of yellow feathers on strings of human hair around their necks to bite into during battle, like modern boxers who brace their teeth tightly on mouthpieces during a fight.

Although all of this plaiting, braiding, interweaving, and basketwork is characterized by the fact that the human hand alone does the entire work, without any other help than an occasional awl, other manufactured goods call for the use of additional tools like the netting needle of wood or bone and a small board over which meshes are slung. A large work frame is the technical stand-by of many native braiders. The Naskapi, for instance, manufacture on it their exquisite 'rabbit-skin blankets' from cords of moistened fur coils, diametrically cut into strips. The blankets have the appearance of a large fur robe of one piece, but in reality are nothing but a network of interwoven single strips.

The fur blanket of the Maidu of California, for instance, is of simpler workmanship than the type I observed in Labrador. The Maidu knot their fur strips into one long strip which they "wind back and forth between stakes to form a vertical plane of horizontal warps. Into this the continuous double weft, two lines of the same material, are twined alternately up and down and knitted to the outermost warp on each turn." The Labrador Indians use the much finer technique of crocheting with a wooden needle over a frame. This produces a completely regular blanket, with tiny invisible air holes between the coils of fur that give it great insulating value. Other California tribes weave cord blankets with feathers knotted into them.

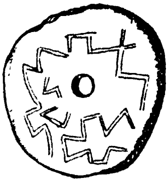
Whoever sees the finished products of these techniques is impressed with the regularity, smoothness, and neatness of its texture which has all the fine qualities of delicate handiwork. However, no regular weaving was possible without the existence of a thread better perfected than the short, twisted coils or cords of old.

The desire to obtain a long, fine thread of equal thickness required the invention of a new tool—the spindle. The simple stripping and cleaning of the fibres or, more technically, their scutching, and their loosening and straightening out, or carding, are known to many cultures. But regular spinning requires also, in the words of Hooper, "the drawing of the carded filaments out in an even rove and twisting them together into fine or coarse continuous thread." The same author gives a good definition of the spindle when he says : “ If a small stick, having a hook at one end and a weight at the other, be suspended to the spinning thread, the further even twisting of the yarn will become much easier, because regulated by the continuous revolution of the weighted stick or spindle, as such an appliance is called.”



NEOLITHIC WHORL

Found at Knossos

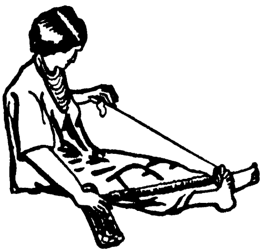


PREHISTORIC SPINNING WHORL

Thessalian Sesklo-Culture

After O. Menghin

As soon as man began to settle down the spindle appeared among his most important tools, and we can actually say that the invention of agriculture and the appearance of the spindle as a cultural element are closely interrelated. The oldest findings from the times of prehistoric man show that weaving equipment existed in every household of the earliest settled tribes. The clay whorls found in the lowest layers of the Anau culture at Merw in Transcaspia go back to about 3500 B.C. Similar specimens were discovered in the ruins of Eridu (the Abu Sharein of to-day) and in the so-called Sesklo culture of prehistoric Greece, as well as in the remnants of the Cretan Neolithicum. Especially numerous are the loom weights and spindle whorls found in the homes of the ancient European Lake Dwellers, where even parts of looms, frames, and thread-twisting machines have been preserved through the millenniums, together with fragments of mats and woven linen cloths. The primitive spindles of our time are still exactly like those earlier specimens which were also used in the ancient high cultures of Egypt, India, and Peru. No Peruvian noblewoman left her home to go visiting without a maid behind to carry a basket containing her spindle and other gadgets necessary for needlework.



SPINNING CHIMANE INDIAN WOMAN

Bolivia

After Nordenskiöld

The facts show that the loom, which was developed from the braiding techniques, is an invention of women. Men became weavers only in the younger cultural stages, when trades and skills began to be specialized. The form of the loom is derived from the braiding frame with its simple series of parallel strings or warp, through which the work thread or weft is alternately laced. The natives of Melanesia and of tropical South America, also many North American Indian tribes, braid head-bands, sashes, garters, and belts on this type of simple frame. The lacing needle of bone or wood is the forerunner of the weaver's shuttle and reed.

As to the forms of primitive looms, they are of such great variety that their analysis would be a study in itself. The anthropologists Chapple and Coon have divided them, according to their mechanical principles, into three main groups : the one-bar loom, a wooden cross-bar suspended between two poles ; the two-bar loom, in which the warp threads are stretched between two fixed bars, mostly used in horizontal position, with needles operated by foot treadles ; and, finally, the high-culture two-beam loom, which introduces revolving cylinders and allows the manufacture of cloth of unlimited length. The last adds so many improvements that it can indeed be regarded as the model after which the modern industrial loom has been fashioned.

These hand looms, then, are the machines used to weave the delicately textured fabrics which so often are of better quality and workmanship than the products of our own factories. The unhurried manner of their manufacture, the inwoven patterns of mysterious age and significance, and the mellow, subdued natural colours produce effects of lasting quality and beauty.

Weaving looms are limited to certain relatively narrow regions of the globe. The loom appears comparatively late in the array of man's material possessions. It does not occur in the otherwise highly developed Polynesian cultural circle. With the exception of south-western United States where the Pueblo and Navaho are famous for their multi-coloured woollen blankets and materials for wearing apparel, the loom did not penetrate the North American Indian cultures. It is also absent from South Africa, the steppes of Asia, and from the arctic regions, where felt and animal skins are substitutes for woven fabrics.

The logical development of the loom from the art of basketry is indicated by the earliest materials used for threads. They are all plant fibres : banana bast, nettles, hemp, and cotton in the hot regions. Woollen cloth is of much later origin.

Among the best African weavers are the Tikar of the Cameroons, whose cotton loin-cloths, dyed with redwood, are of striking appearance. The large robes of the Hausa chieftains and others feature colourfully striped ornaments ; and the cotton-padded ' Phrygian ' caps of West Africa are examples of finest workmanship.

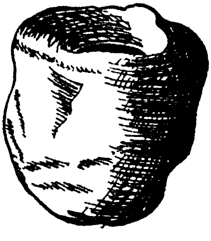
In addition to their delicately braided sleeping and ' money ' mats, the natives of Melanesia weave loin-cloths of banana fibres, mostly decorated with fringes and with hemstitched borders of exquisite symmetry.

The multi-textured materials woven on the looms of the ancient high cultures are masterpieces of art and precision. The Peruvians of pre-Columbian times, whose religious ritual required the offering to their gods of woven masterpieces manufactured by the Sun Virgins, produced pictorial pieces like tunics and shoulder-throws whose patterns told whole stories or celebrated sacred figures like the jaguar demon or the zigzag snake. Spear throwers and flying birds decorate their ancient garments. Shirts, belts, and fringed sashes found in their prehistoric graves show a perfection of weaving which surpasses the much younger products of the great Parisian Gobelin. The magnificence of the Egyptian fruits of the loom is known from the findings in the Valley of the Kings ; the Chinese gold damasks, the Persian velvets, the Coptic ' Turkish towels,' all made on hand looms, cannot be equalled by modern imitations.

In spite of the magic of modern textiles and recent triumphs of the laboratory, one ancient fabric has remained the legendary masterpiece of the ages. Lives have been risked, spent, and sacrificed to obtain the secret of silk, so jealously guarded by its Chinese inventors through millenniums. The princes of old and the potentates of the Churches craved it for its regal splendour, and even to-day the words ' genuine silk ' overshadow by far the chemical glamour of nylon and its derivatives. About 200 B.C. the Koreans succeeded in discovering the details of silkworm raising, and the knowledge of the technicalities behind the Divine Fabric penetrated slowly to Japan and to Inner Asia, finally reaching Persia and Tibet. It was not until the sixth century A.D. that Justinian introduced it in Byzantium, and it was only after this that the Greeks succeeded in adding the knowledge of ' silk raising ' to their arts. No primitive tribe can claim the invention of silk or has been able to manufacture it. The road of silk is the road of civilization.

While the art of weaving goes back to the ancient knowledge of braiding and of basketry it is not the only skill developed from these old techniques. A younger sister of the art of basketry, also invented by women, is the manufacture of pots and vessels out of clay—ceramics. Although the materials of basketry and of pottery are completely different, the manner of shaping containers from both is kindred indeed.

One of the most ancient methods of making earthenware, the fashioning of receptacles from clay coils, goes directly back to the spiral-coil technique of basketry. This, however, does not imply that the tribes familiar with the oldest braiding techniques are necessarily also potters. Like the weaving loom, the art of pottery does not appear in the material culture of man before the stage of agriculture has been reached. The roaming tribes of earlier complexes had neither the time nor the opportunity to develop handicraft patience and working conditions of sufficient stability, nor could they easily transport the fragile ware whose use is beneficial only to permanent households.


CRUDE EARTHENWARE CUP
Found in a Mound near Lodi, Calif.
After Nordenskiöld

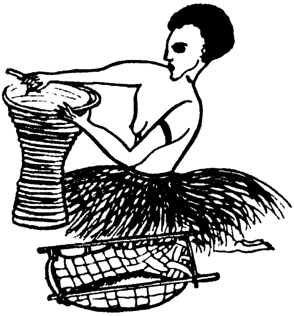
As to the invention of pottery, the general assumption is that it developed from the habit of plastering woven containers with cement or clay to render them waterproof, and that the usage of such vessels on or near the fire suggested the idea of shaping them from clay without further dependence upon the original basket. This assumption may be correct. We have no means of knowing to-day. But although this story of development may hold true as far as sun-dried clay containers are concerned, it is more than doubtful whether baked earthenware can be regarded as of similar origin. A scientist of the distinction of Nordenskiöld calls the idea 'preposterous.' He believes that such accidentally baked pieces of plastered basketry would by no means turn into baked earthenware, but rather into 'a rubble of burnt clay,' and suggests that a knowledge of the washing and the preparation of the clay and the shaping of initial tiny bowls must have preceded the 'building-up methods' applied in the manufacture of larger vessels. This example of divided scientific opinion on the origins of pottery serves perhaps best as an illustration of the challenging nature of such problems.

Ceramic-making tribes have different methods of processing clay, according to the consistency and composition of the soil they have at their disposal. The clay is cleaned and dried. Dirt particles are removed by sifting. If the clay is too 'fat,' it is mixed with binding materials like sand, grit, ashes, or even tiny particles of wood or grass. In South America the application of sponge spicules in the clay was an independent Indian invention. If the 'dough' has gained a smooth mouldable consistency it is ready for the working process.

The shaping of containers in the different regions of the world follows five principal methods—four of them primitive, one characteristic of the high cultures exclusively.

The simplest and crudest way is to take a lump of clay and gradually press down its central part, which raises the outer sides. In this rough shape the outer sides are beaten with a piece of wood while a stone is held against the inner part to counteract the pressure of the beating. The Papua of New Guinea, who also have other methods, make most of their pottery in this manner.

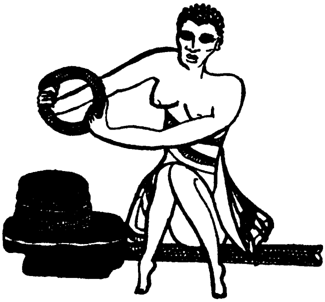
The spiral-coil technique uses one long coil of clay which is built up from the bottom in circular fashion until the desired height has been attained. The inner and outer sides of the pot or bowl are then smoothed out with the aid of a stone or a piece of wood.



SPIRAL-COIL POTTERY

South-east Coast of New Guinea

After Hurley



COIL POTTERY

Baila, North Rhodesia

Very similar is the method of building up a container from a series of rings. Each ring is larger than the one previously used, with the smallest forming the bottom and the largest the upper rim. As in the coiling technique, the contours of the rings are then smoothed together.

The fourth method requires the initial shaping of a round clay bottom, to which a number of side flaps are attached. These are built up and worked into each other by a slow turning of the vessel.

The fifth method, which alone is the exclusive invention of the high cultures, makes use of a mechanical device, the potter's wheel, whose invention, as the invention of all wheels, was revolutionary in so far as its mechanical principle has no equivalent in nature. To think it out was a triumph of human imagination independent of the imitation of phenomena observed in nature. The revolving potter's wheel was known in Egypt before the beginning of the third pre-Christian millennium ; the craftsmen of Crete used it during the oldest stages of the Bronze period, and it was known in many parts of India. Its first European appearance was about 500 B.C. in France and southern Germany. It was unknown on the entire American continent.

Primitive earthenware is baked in an open fire, and many vessels and containers are beautified with engraved or painted ornaments. The knowledge of the glazing process is reserved to the high cultures.

The natives of West Africa have an interesting method of engraving patterns into the smooth clay of a vessel. A wooden stick is carved in very sharply contoured patterns and rolled round the container in such a way that the ornaments are pressed into its surface in a regular and symmetrical fashion. More complicated patterns can be obtained by a crosswise application of the wooden stencil. In the Cameroons the pots decorated in this manner are dried for a few hours and then burnt during the night. The result is earthenware of great sturdiness and attractiveness. The West African vessels vary in size from small bowls to round cooking pots of great dimensions.

Among the North American Indians only a few tribes like the Pueblo and the Hopi are expert potters. But their great art has declined during the last several centuries. The spiral-coil pots of the cliff dwellers featured striking black ornaments, and the multicoloured earthenware of the abandoned Hopi cities were masterpieces. To the California tribes the art of pottery is almost a forgotten skill ; modern Indians must consult their grandparents to learn how the vessels which are still in use were originally created.

The South American Indians are the inventors of pots with hollow rims. In stoneless regions they had an ingenious method of replacing the stones originally used for stone cooking (by heating a stone in the fire and putting it into the food-filled container) by clay balls. These Indians also fashion clay pipes of peculiar shapes. A study of the earthenware pipes of man would lead one all over the globe, from the jungle to the parlours of old Holland.

The ancient high cultures, especially of Persia, India, Egypt, Mexico, and Peru, have contributed the most perfected examples of ceramics. Magnificent water-jugs, often in the shape of human heads or figures and comparable to the English Toby jugs, have been found, especially in the graves of Peru. The museums of the world are filled with countless examples of earliest ceramic art.

In the science of prehistory the manifold shapes of ancient pottery have even served to name cultural periods according to the forms and ornamentations of the earthenware manufactured by the artisans of the particular times.

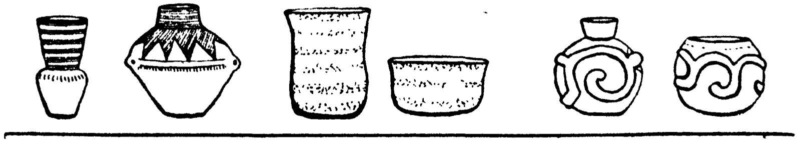
While the Stone Age craftsmen of the Palæolithicum—hunters and food gatherers—could not advance to the art of pottery, the Neolithicum, the age of the earliest agriculturists, abounded with ceramic products of exquisite shapes and decorations, and its three principal periods obtained their names from their pottery. We speak of the Neolithic periods of 'corded ceramics' (*Schnurkeramik*); of 'bell-shaped cups' or 'zonical cups' (*Glockenbecher*, *Zonenbecher*, *vase a campana*); and of 'band ceramics' (*Bandkeramik*). Remnants of these have been found in northern and central Europe, on the Iberian Peninsula, in Italy, France, Great Britain, and the ancient Danubian cultural centres.

But the modelling of clay, even in the earliest times, did not serve only practical purposes. The shaping of human figures from moulded clay, whether for the sake of magic or mere æsthetic joy, was practised by primitive man in central Europe as early as during the Aurignacian, and animal idols and statuettes, especially of women, abounded in the Neolithic Age as a parallel feature to the beautifully ornamented vases, spinning whorls, clay stencils, and the like.

WATER-JUG
Clay
Peru
Museum of Ethnology, Cologne

In the ancient Egyptian tombs multitudes of clay figures and clay tools and gadgets have been found. These were meant to serve the departed in the other world. Hundreds of them are among the treasures of the British Museum—from the tiny plates of clay filled with symbolic fruits and vegetables to the multitude of symbolic figures and amulets.

PRINCIPAL GROUPS OF NEOLITHIC CERAMICS



'Corded' Ceramics 'Zonical' Cups 'Band' Ceramics

After Déchelette

The climax of ceramic art was reached with the invention of porcelain, another gift of high culture which China has added to the material possessions of man. Its first appearance can be dated back to about A.D. 700. Porcelain originated from the desire to create a substitute for the precious nephrite plates and dishes of the oldest times, which the earliest specimens of Chinese porcelain imitate as closely as possible in shape and colour. Hence the oldest chinaware is not white, but green, grey, or bluish, in the shades of the cherished and valuable stone. The desire for thinness and fragility was developed much later, when the porcelain was no longer regarded as an imitation of the nephrite but became cherished on its own merits as a material capable of producing shapes of utmost delicacy and fineness.

Even to-day the Chinese porcelains manufactured especially in the ateliers of Chingtehchen (Kiangsi Province) are about the most valued in the world. At all times porcelain has graced the tables of the mighty. It was one of the first concerns of the Japanese invaders of the Second World War to carry off as many of the treasured Chingtehchen pieces as possible. When victory finally came the Chinese government commemorated the event by ordering a special series of bowls and vases from the artisans of Chingtehchen, as a national gesture to mark the resurrection of the glory of China.

But the raw materials of the mineral and the plant worlds have not alone been utilized by man to fashion things he needed or wanted. The animal world has its equal share in primitive industry. Besides the horns and bones which were shaped into tools, the skins of hunted animals have provided very important additions to the material possessions of humanity. We saw that among the oldest tools uncovered in the prehistoric findings were fur scrapers, skinning implements, and the like. It is certain that the ability to skin animals is among man's earliest skills.

Although the knowledge of skin tanning, dressing, and currying is by no means known to the most primitive tribes, the Australians sew animal skins together with kangaroo sinews to fashion them into garments where the climate is rough. The South African natives wear crude versions of fur coats, and the indispensable stand-bys of the Fuegians are their wraps of guanaco fur and their large sleeping blankets of the same material. The entire African East Coast, from the southern tip of the continent up to the equatorial forests, uses animal skins for various purposes ; and certain regions of the Sudan can be regarded as regular ' leather provinces.'

While animal skins are utilized on all continents, the treatment of the raw hide to turn it into leather of greater or lesser smoothness and pliability varies considerably. In this field the herdsmen are the best artisans, but the arctic and subarctic hunters and the tribes of Inner Asia also know how to get the best use of their animal skins. For simple water containers, tent covers, carrying bags, etc., they merely scrape off the meat and sinews from the flesh side of the pelt, but whenever smooth leather is needed for the manufacture of garments, moccasins, caps, and the like, the hair must be removed. The cleaning is done with fleshers of stone, bone, slate, or shells, often with the help of a scraping beam, whereupon the removal of the hair can begin. Although some tribes simply pull out the furry parts, others soak pelts in water to detach the fur.

Among the various methods of removing hair is that of burying the skins in the ground, often with the addition of ashes or leaves, as in Africa, or of soaking them in a yucca concoction, as in California. Soaking in urine is an arctic method which also was known to the ancient Greeks and Romans. After any of these treatments it is easy to pull out the loosened hair either by hand or by rubbing the skins over a tight rope, as is done in many places in Africa. The Naskapi lace skins into a vertical frame and work on them with the thigh-bone of a bear or a beaver tooth.

Although the art of currying animal skins with salt, alum, and other minerals is a high-culture invention, the primitive manufacturers of leather know many methods of making it pliable and smooth. Fish oil, moss, and animal brains or livers are worked into the skins, followed by rolling, pounding, wringing, and other manipulations. The old explorer Mason is only too accurate: " Human muscle is the chief ingredient in aboriginal tanning."

Primitive methods of dyeing prepared skins are very numerous. The caribou skins which the Montagnais-Naskapi use for their moccasins have, after processing, a snowy-white appearance and are exceedingly smooth and flexible. To make them more practical for wearing, these soft skins are dyed to a mellow brown over pails filled with smouldering wood particles. The leggings and moccasins of the Blackfoot Indians were smoked similarly over oak rind, which caused their black colouring and gave the wearers their name. A leather-dyeing method of the Eskimos is to ' chew ' the juice of the purple snail into the prepared skins, which produces a beautiful red colour. The bark of the white maple mixed with yellow ochre makes the blue dye of the Omaha ; cactus juices were used by the leather dyers of the prairies, and the deep-red colour of the African Hausa and Mandingo is obtained by treatments with the bark of the mangrove-tree.

While these practices aim at the utilization of cleaned animal skins, another important industry concerns itself with the hair removed from pelts exclusively. This is the art of felting. It is most important to the peoples of Central Asia and to the tribes of the Sudan. In Tibet it has reached especially high perfection. The pelts used are the skins of the yak, whose leather, always uncured, provides the material for boots, saddles, and harnesses. For felt-making the yaks are shorn. Since animal hairs have tiny hooks they have a tendency to stick together when properly treated. The carded fibres are spread out, moistened, and compressed, and joined so firmly that a fabric-like material, sturdy and waterproof, results. The finest felts of Tibet are as thin as veils. If thicker felt is desired for coverings of the winter tents or for saddle paddings, boot linings, flooring, and other equipment, additional layers are pressed and rolled upon the previous ones.

It is interesting to note that most wool-producing peoples do not spin the fibre into cloth and that the manufacture of felt is older than the weaving of animal hairs into fabrics.

Plants, minerals, animals contributed to man's early industries ; but his skill enabled him to penetrate into the surface of the earth to discover copper and iron ores ; to learn the secret of the gold-bearing rivers ; to melt different metals for producing alloys ; to erect furnaces in the wilderness. The capacity for making metal tools brought a fundamental change to the trades inherited from earlier ages. New possibilities of construction and of conquest arose. New independence, new inventions, new industries, strengthened the power of man.

The Iron Age, of which our present age of steel is merely a late phase, began in Europe three thousand years ago, when the knowledge of iron manufacture penetrated the Mediterranean regions. In China, however, the metal was already mentioned in the records of the administration of the Emperor Yao during the year 2357 B.C. In Egypt it was known in 2800 B.C., although there it ranked as a curiosity until 1600 B.C.

Despite this respectable age, the discovery of iron is the youngest branch of metallurgy. It was preceded by the Bronze Age, which developed from the knowledge of copper manufacture.

When we think of the ancient metals our imagination likes to dwell on the treasures of silver and of gold that came from Egypt and Ur, Bolivia and Colombia ; the legendary riches of vanished kings and empires which have been brought to light in the Valley of the Kings at Thebes, in Persia, in Greece, and in Mexico. Although the ancient high cultures abounded in manifestations of wealth and luxuriant art unknown in our time, their golden cans and vases, necklaces, nose and ear ornaments, idols and luxuries, were not an expression of a very high living standard for all, but rather of the privilege of the very few, whose riches were created amidst the frightful poverty of the many. We can be sure that the goldsmiths of the Chibchas who shaped silver and gold vessels for household use and who soldered gold wire on the golden masks and ornaments were as poor as the slaves who mined gold for the Egyptians. All the artistic treasures of the ancient empires could not have been created, however, if the right tools had not existed.

GOLD SMELTER

Ancient Egypt

After Rosellini

Copper and bronze were the oldest metals shaped into tools. They go back to the end of the Neolithicum and mark the beginnings of the Bronze Age, when the art of mixing copper with tin into a new alloy—bronze—was invented. This technique was known in Crete as early as during the end of the fourth pre-Christian millennium, but it was spread over so many other regions of the globe that the location of its first appearance cannot be determined to-day.

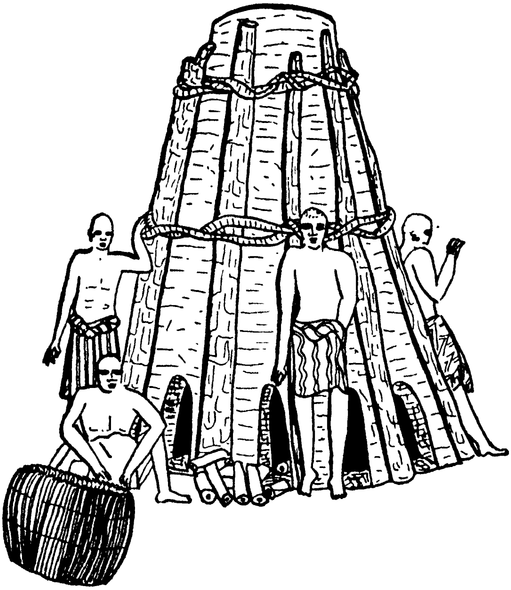
Five thousand furnaces stood on the plateaux around Potosi in the bronze-manufacturing regions of ancient Bolivia. And in China the bronzes of the Shang Dynasty (1766-1122 B.C.) followed in their execution the firmly established rules of artistic tradition. After millenniums of burial in the tombs of China, these bronzes have assumed the classic patinas of " pure blue as the plumage of the kingfisher " or " pure green as the rind of a melon," which only very genuine and very pure bronzes show when continuously exposed to water or to air.

WINGED IBEX

Handle of a Silver Vase: fourth century B.C.

Louvre, Paris

When we think of primitive metallurgy, however, we look in the direction of Africa, because it was from there that astounding evidences of perfected metalwork have come since the discovery of the Dark Continent. When to-day we find bracelets, tools, and ornaments cast in bronze by the tribesmen of Adamaua, Nigeria, and Togo this is merely a last reflection of the glamorous African period of the so-called *cire perdue* process, which reached its climax in the bronze-relief plates and the magnificent human and animal statues adorning the palace of Benin. Judging from the appearance of the costumes of Europeans often depicted in these works of art, this industry of West Africa was at its height during the sixteenth and seventeenth centuries.



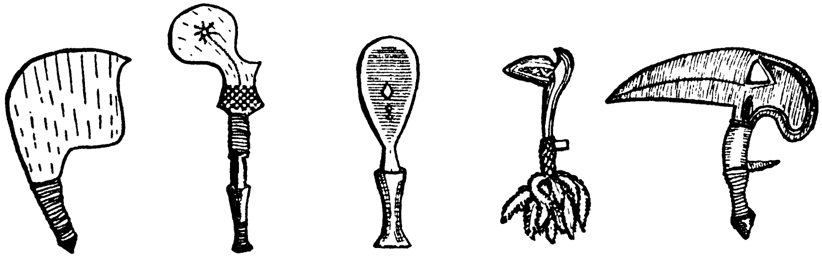
IRON FURNACE
Tanganyika, East Africa
After Schmidt-Koppers

The technique of the *cire perdue* begins with the shaping of a wax model of the figure to be cast (shaped around a clay kernel for larger objects), which is then coated with a layer of brick meal or sulphate of lime. When this has been dried air holes and cast openings are drilled. The mould is then exposed to the fire which melts the wax. It can now be filled with the liquid metal. The resulting statue or relief is completely free of any casting marks and can be completed with the help of files, hammers, and puncheons.

The Benin pieces all show delicately engraved backgrounds with floral and geometrical ornaments which might have aroused the envy of Benvenuto Cellini, that great Renaissance master of the *cera perduta* technique.

The most exciting story of African metallurgy, however, is the saga of iron. Although not all African tribes know the art of iron smelting (the Bushmen and most Pygmies do not), it was most probably known to the Negroes before the whites knew of it. It can rightfully be called a thoroughly African achievement. Noted scientists like Luschan have firmly established the fact of its African origin, although others claim its migration from South Asia or Asia Minor. Be that as it may, Africa is really the classic land of native iron technique. Its towering furnaces were built by the natives long before history was recorded. But the smelting furnace is not an inevitable necessity in primitive iron manufacture. Some tribes still melt iron in the ancient hearth pit, which resembles the ancient earth oven in which smouldering stones cooked the earliest meals. The sight of these white-hot stones in the fire may be responsible for the discovery of the technique of iron melting.

AFRICAN KNIVES



Chieftain's Knife
Karissme

Striking Knife
Bayansi

Striking Knife
Ubangi

Throwing Knife
Congo Basin

Hewing Knife
South Cameroons

Lindenmuseum, Stuttgart (after K. Weule)

The ability to work off the ore presupposes the existence of simple smelting gear, especially of the bellows, whose oldest forerunners are the fan and the blowpipe. From the latter the two fundamental forms of primitive bellows have developed: the bag bellows of animal skin with a wood-framed opening, and the pump or piston bellows consisting of a box or pipe from which a piston pumps air into the hearth pit or furnace. The pointed European hand bellows is a combination of both.

The equipment of the primitive blacksmith is of utter simplicity. Pieces of metal or of stone serve as hammer and anvil; two wooden sticks or an iron pincer are his tongs. The number of his products varies from the tools of agriculture, of industry, and of war, to gigantic pieces of 'jewellery' like iron cuffs of arm length, iron collars, iron beads, and the multi-shaped hewing knives for jungle clearing, the 'money' in the shape of spearheads, and the countless articles facilitating hunt and home life. Iron chains are especially well made in East Africa, and even twentieth-century technique could add nothing in principle to the African art of wire drawing. The smelting furnaces of Gurma, Togo, and Yoruba extend to fifteen feet and higher. The Fulbe and Mandingo artisans belong to the best native blacksmiths. Among the western Bantu iron is mined in adits longer than a mile. The Dark Continent is indeed the continent of iron!

The social position of the blacksmith is one of the most interesting facets of this great industry. While he enjoys a highly privileged position, especially in the western Sudan, where he is a priestlike protégé of kings and chieftains, his position throughout the entire north of Africa is that of a feared and disdained pariah. Stuhlmann explains this attitude from the fact that the later-arriving light-skinned Hamitic and other tribes, who found the Negroes in the possession of a secret they had not known, developed feelings of suspicion and jealousy against them.

In other parts of the world, like Tibet, blacksmiths are regarded as members of the lowest caste. Here, the reasons are religious. The slaughterers of the 'holy' Buddhist cattle and the men who forge the knives to dissect them are lowly creatures who can never rise to lamadom. This does not mean that the faithful would not participate in the forbidden eating of meat. A shrewd way out has been found in the holy city of Lhasa. There a lama reads a religious mass over any ox to be killed, thereby safeguarding the animal's reincarnation and the protection of the smith who furnished the knife from mishaps in the hereafter. Among another Asiatic people, the Buryats, the blacksmiths are the cream of society, freed of paying taxes and regarded as related to the gods. The Mongol *darxat* are smiths with the rank of knights.

The importance of iron is expressed in many Biblical references, like the one in 1 Samuel xiii, 19, 20:

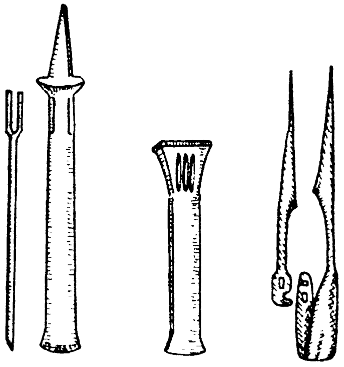
> Now there was no smith found throughout all the land of Israel: for the Philistines said, Lest the Hebrews make them swords or spears: But all the Israelites went down to the Philistines, to sharpen every man his share, and his coulter, and his axe, and his mattock.

Even then, the possession of iron decided battles and made world history, as we learn from Judges i, 19, and iv, 3 :

> And the Lord was with Judah ; and he drave out the inhabitants of the mountain ; but could not drive out the inhabitants of the valley, because they had chariots of iron.
>
> And the children of Israel cried unto the Lord : for he had nine hundred chariots of iron ; and twenty years he mightily oppressed the children of Israel.

The importance of metal tools in the ancient high cultures was tremendous, as was noted by Flinders Petrie. " Thousands of writers," he said, " have described the sculptures of the Parthenon, not one has described the means used in performing that work." In his interesting study of old-world metal tools he shows that " the forms of the chisel were perfected 2500 years ago," and that " saws and crown-drills with fixed teeth of corundum or gem stones for cutting quartz rocks were used in Egypt 6000 years ago." In fact, many ancient tools have not only remained unsurpassed by modern man, but the original good design has in some cases actually deteriorated or been forgotten during the ages. This holds true especially of the Egyptian detachable shears and an Egyptian sickle of extremely efficient shape.

EARLY EGYPTIAN TOOLS



Bronze Chisels Square Socket 'Roman' Shears

After Petrie

As to the invention of the manufacture of metals outside Africa, Asia, and Europe, iron was not known to the aborigines of other continents. The only Indian tribe which learned to smelt iron ore, the Campas of Peru, adopted their technique from the whites. The entire Pacific area did not know the use of metals. The North American Indians of pre-Columbian times manufactured tools from copper found in their regions, just like their northern neighbours, the " Yellow-knife " Eskimos. However, these tools were hammered into shape, since the natives had no knowledge of the smelting process. For South America, Nordenskiöld claims an independent invention of bronze.

In Africa the process of melting iron is often the centre of a regular religious ritual. The Ganguelas of Angola who dig the hearth pit must remain without food or any sexual intercourse for a long time. Sacred roots are thrown into the pit, and are then moistened with the blood of a sacrificed chicken to the words : " We kill you not for the sake of your meat, but that the iron may come."

The Pangwe do not begin the good work without the preparation of expensive ' holy medicines.' The ability to melt iron has to be paid for with five sheep, five chickens, and five pieces of brass wire, cashed in by the medicine man, whose presence is obligatory during the smelting. The magic ingredients—a bunch of leaves, ' sacred ' bark, poison, and some brain substance of an ancestor (" to watch the smelting process ")—are enclosed in a small pot and put into the pit, which is then filled with charcoal and the ore and covered with a top layer of more coal. When a burning piece of coal has been introduced into the pit the servants of the bellows begin their work, accompanied by the sound of the medicine man's iron bell and his songs, cries, dances, and wild notes blown on an antelope horn.

Among the Asiatic Buryats a man may become a smith only if he has other smiths among his ancestors. No ordinary tribesman can enter the sacred profession. On the other hand, the qualified man who refuses to accept the great distinction of becoming a blacksmith will die. An old myth of the Buryats tells of the unhappy times when men lived miserably without the knowledge of iron. One blessed day, however, the good ghosts, or *tengri*, decided to send the god Boshintoj and his nine sons down to earth to teach mortals the sacred trade. Boshintoj soon returned to the skies. But his sons married the daughters of men, and their first pupils were the ancestors of all smiths to come. All of the nine have individual names and are the patron saints of the tools of the smithy. In their honour the shaman sings, as Sandshejev reports, a holy litany in a ceremony built round their worship :

You nine white smiths of Boshintoj !
You, who own the flying spark,
The noisy, sounding tools,
The firm anvil of steel,
The squeaking file—
You descended to the lower world,
A silver-mould on your chests,
Tongs in your left hand !
Mighty is the magic of the smithy,
Magnificent the marvels
Of your mighty bellows—
Ah, you nine white smiths of Boshintoj,
On your nine white horses,
Mighty is the spark of your flame !

And so on, until "the divine spirits of the forge have been appeased."

Mighty is the power of iron—but mightier still is the imagination of man.

When we consider the primitive crafts as a whole we find in the earliest beginnings a logically and cleverly executed division of labour between the sexes. Among the Pygmies and the Bushmen of Africa, the Australians and the Fuegians, the woman is considered and treated as the mistress of the household, while the man is the expert on hunting tools and all activities related to the hunt, including, for instance, the Pygmy manufacture of arrow poison. The Vedda wife of Ceylon digs the yams and prepares the food, while her husband brings home animals of prey.

An interesting survey of the tasks of the two sexes of the Andamanese has been furnished by Mann, who mentions among the daily duties of the husband the following activities: hunting, fishing, the catching of turtles, the gathering of wild honey, the building of the canoe and of the solidly constructed huts, the manufacture of bows, arrows, and most household implements. The women of the same tribe are responsible for the household, care of babies, obtaining vegetal foods, cooking, providing water, care of the fire, building light huts, and the manufacture of the simpler household containers and the 'jewellery.' Furthermore, it is the women's task to shave the rest of the family and decorate their skins with scars and tattoos.

While in the earliest cultures everybody manufactured for himself whatever he or his family needed, the development of specified trades does not occur until the agricultural stage has been reached, when it is not uncommon for the man to assume what had been feminine tasks previously. In the East Mbamland of the Cameroons, the women of the tribe are potters while the men take care of braiding and fibrework. In contrast to this, the men of Togo are the ones who shape the earthenware vessels of the household. On Santa Cruz Island the women are almost exclusively responsible for the care of the fields, cooking, and fishing with nets. The men dedicate themselves to the manufacture of most material possessions with the exception of bark-cloth making, which is women's work. The braiding of the all-important mats and the manufacture of tools and weapons are done by the men, who often do their work collectively in a club-house. In Melanesia the women are exclusively responsible for the manufacture of ceramic products.

How manifold was the technical education of, for instance, a Maori boy in all male trades has been recorded by Best. The training of such a young man ready to start out in life began with the manufacture of greenstone and bone tools, of spears and spades, and later he was taught the making of the scuffle hoe and the smaller tools necessary for the care of the taro crops. His advanced courses taught him the construction of " houses, huts, cooking sheds, store-houses, also elevated platforms or stages on which certain food-supplies and other things were stored." He learned the construction of windbreaks, shelter huts, and hamlets, " the art of dressing timber with stone adzes of two kinds and the use of the wooden beetle and wedges in splitting timber as material for dwelling-houses, store-houses, defensive stockades. The use of stone chisels and drills was also taught, also the art of wood-carving and of painting designs." " Yet another course of instruction," Best says, " was that connected with the making of canoes and their numerous appurtenances, and likewise the manufacture of fish-hooks."

Often the restriction of different skills to one or the other sex leads to such specialization that a lack of versatility is the result. This is especially true of Africa. Individual craftsmen began to make one article exclusively, and all who wanted it had to trade with them. Tessmann reports from the Pangwe that among them a man manufactures, for instance, spoons, and refuses to carve ladles ; that a stool-maker makes only stools ; a crossbow-maker makes only crossbows ; a man's carrying bag is obtainable only from the manufacturer of men's carrying bags, and so forth. This often makes it necessary for the tribesmen to undertake long trips to procure a simple gadget like a baby-carrier, consisting of two leather strips, which anybody can make, but which only one man is entitled to manufacture.

The growing tendency towards specialization, then, led finally to the formation of regular professional groups and castes in the high cultures. The strongest manifestation of this was the guilds of the European Middle Ages. Our machine age has gone further. On to-day's assembly lines in the great factories we find men who make one screw, one bolt—one part exclusively—as long as they live. This may serve the efficiency of large-scale mass manufacture, but whether it is an effective means of developing the powers of initiative in a man is another question.

In primitive cultures, as well as in our own, over-emphasized specialization most certainly causes a deterioration of individual skill. Among the primitives it can lead to complete abandonment of a knowledge once possessed. This is especially true under the influence of the white man's importations. It is one of the reasons why the word ' progress ' should be used only with greatest reservation, because for what we learn in the technical world we sacrifice an older skill which may not be inferior as far as dexterity and initiative are concerned.

A Labrador Indian whose steel traps had been stolen managed to save his very life by remembering how his grandfather built the ancient wooden traps. All over the world we can observe the dying of old artisanship and true handicraft. Cheap ironware replaces the beautiful stone knives ; glass beads supplant ivory and tortoise-shell ; bright aniline paints kill the knowledge of the blending of the soft mineral and plant colours. In India the famed lac dyes, once a source of employment for thousands, vanish under imports ; the arts of leatherwork and tanning are rapidly being forgotten. The products of the Lancashire mechanical looms replace the output of the native cotton mills of Bengal.

In our metropolitan centres of progress we often have trouble in finding a watchmaker skilled enough to repair a timepiece with the care and efficiency such precision work requires. Our great respect for antique furniture comes in part from our knowledge that modern manufacturing methods provide for neither the time nor the skill to produce objects of lasting value. Even the native implements frequently offered to our museums show a marked decline of quality. It is one of the criteria of a good curator to distinguish between the careful products of traditional workmanship and the export ware which reaches us only too often from the ' primitive ' corners of the globe. Our artisans have realized the danger, and the civilized efforts to save the skills of, for instance, the Navaho Indians and of the sculptors of West Africa have led to the establishment of schools for the preservation of native handicraft.

The most modern twentieth-century prophets of applied art try to awaken a new appreciation of hand-made things and to achieve qualities comparable with those of the first primitive manufacturers to whom ' the best for all ' was no problem.

CHAPTER SIX

Having a Good Time

WHEN WE SET out to enjoy ourselves we have to go through considerable preparation for our pleasure, like buying tickets, dressing, arriving on time, or preparing our homes for the reception of guests. Whether we know it or not, all these preliminaries take some of the impetus out of our joy. Furthermore, the 'relaxations' of civilized man are often of a strenuous nature.

BEER-BREWING WOMEN
Belgian Congo
By courtesy of the American Museum of Natural History, New York

Primitive man is much luckier in this respect. He need make no effort to prepare for a good time. His gay nature, unshackled by conventions and frustrations, keeps him at a mental level of comparatively permanent happiness. Not that he lives in a paradise; his hardships are plenty. But he is so perfectly adjusted to his narrow and perilous world that he takes even unavoidable disappointments in a calm, philosophical spirit. When times are tough the savage cheerfully hopes for a better turn of events. He practically always has a good time, because the notion of time is not a factor in his scheme of things. He is never ' late.'

In the oldest cultures tobacco and alcoholic beverages are unknown. No artificial stimulants are needed to make a gathering festive. Most celebrations are casual. Official feasts on fixed dates are features of the more advanced of the high cultures. When times are good in primitive tribal life they are enjoyed as they come. No egotistical attitude limits the circle of the celebrants to a chosen crowd. Whether it is the neighbourly chat in hut or community house or the great inter-tribal visits of the harvesters, everybody who can possibly be accommodated is welcome to share whatever there is to share.

The good times of the wilderness naturally depend to a large extent on the availability of food. Nowhere does hunger inspire hospitality. But when plenty of game has been brought in, when the fruits—especially the perishable ones—are ripe, when a whale has been harpooned, the blessings of abundance are enjoyed by every one who cares to take part.

The menu of the primitive kitchen is by no means monotonous, although the climatic conditions make for natural limitations. In Tierra del Fuego, for instance, where the cold, moist forests are ' dead ' and covered most of the year with a ' shroud of snow,' the reefs of the shore abound with edible sea-fowl like wild geese, penguins, cormorants, and gulls. Mammals like seals, sea-lions, and whales come in from the sea. Shells and snails, clams, crayfish, and sea-urchins provide variety. The prize roast is the guanaco of the plains. All meat is roasted or cooked in the hot ashes or in the open fire. The cold, humid climate produces few vegetal foods except barberries, but these people keep healthy with their saltless diet and with no beverage other than clear water. To the vitamin addict the word of a Naskapi Indian of the subarctic regions of Canada may provide food for contemplation : " The bear eats the berries, and we eat the bear—so why bother with vegetables ? "

For the nomad hunters of the eastern Bolivian forests, like the Siriones, nature provides a much wider choice. A variety of palm-trees furnishes delicious fruits which are often roasted in the fire ; and tapirs, alligators, wild boars, turtles, squirrels, armadillos, snakes, insects, and even worms are cooked in the hot ashes.

It is interesting indeed to note the culinary possibilities even of rough regions like south-eastern Alaska, where natives treat each other to ' ice cream ' of pounded fish roe or, on the sweet side, to frozen soapberry mush. The Alaskan Indians, who never used salt before the arrival of the white man, have vegetables like wild celery, wild sorrel, and the delicious inner white bark of young spruce-trees, supplemented by currants, cranberries, salmonberries, strawberries, huckleberries, and other berries.

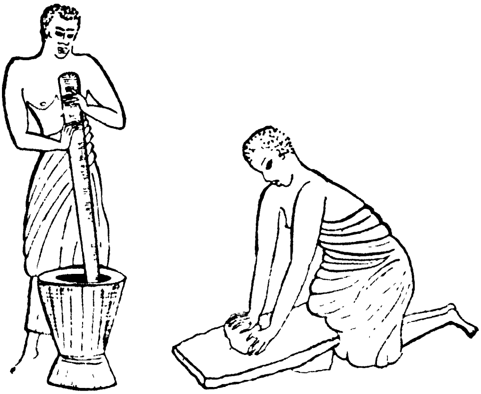
Besides sea food and fowl, they enjoy the meat of the seal, the deer, and the bear, and other wild game. But the five species of salmon that abound in their region are perhaps their most important food. Salmon is eaten fresh or air- and fire-dried, and the heads of salmon and halibut, buried in the ground and eaten after some days, in putrefied condition, are a treat fit for an honoured guest. The method of wind-drying meat and fish is an established Eskimo custom, while smoke-drying, which produces a much tastier staple food, is the typical meat-preserving method of the Indians of Labrador. The Eskimo habit of storing fish in caches and eating them raw, tainted, and frozen, is responsible for their name ' raw-eaters,' as the neighbouring Indians call them.

To the harvesting peoples the plants on which they depend during the major part of the year are not only the sources of food supply, but also the means of their hospitality. In Australia whole tribes are invited to share the feasts held during the lily-root, bunya-bunya, and nardoo seasons, and dances and shows are enjoyed with the assurance that everybody can eat to his heart's desire.

In America the Kamia exchange their wild acorns for the cultivated water-melons of their Diegueño neighbours. The nutting parties of the piñon-collecting Apaches are social events, paralleled by the season when the mescal tubers are gathered. The gathering groups camp in the hills to exchange stories, songs, and gossip, and to enjoy one another's company without having to worry about empty stomachs.

Although delicious trout fill the streams of the Apache region, they are never eaten, because an old legend maintains that once people became very sick after a trout meal. Their skin was " spotted just like the fish in the river " and they died shortly afterward. " From that day to this," says Reagan, " no Apache has eaten fish." The medicine men do their best to keep them aware of the ' danger.'

The fish and the acorns of the Pomo are all of ' mythical ' origin. The knowledge of acorns came to the Indians during one of the five creations of the world (which was destroyed four times by the powers of nature). During the third period *Marumda*, a supernatural being posing as an old man, taught them to pick acorns. " These you will gather, and with them you will make mush ! " He taught the women how to dry, grind, and soak the acorns to make them sweet and how to work the dry and pounded flour into food. Typically enough, the hospitable Pomo women called the old man to their hut for the first acorn meal ; but he had vanished. They consoled themselves with the thought, " He must have left us to teach other people somewhere else." Acorns may be eaten raw ; their flour is baked into bread, or cooked to mush. They are also browned and brewed to make ' coffee.'



BANTU WOMEN POUNDING FLOUR AND KNEADING DOUGH

After Haberlandt

The manifold uses of plant products are widely developed by the agriculturists, who know how to transform the cultivated plants into a variety of foods. The manioc root of the cassava shrub is made into ' cheese ' by the Guarani of Paraguay by fermenting roots for a week in the swamps. The mushy substance obtained is also dried in the sun and pounded into flour, from which the tasty *mandió mbedju* pancakes are baked. The peeled root is either boiled in water or minced, dried, pulverized, and baked in fat as popîs. The unpeeled root is often baked in the hot ashes.

The taro (Colocasia) of the South Seas, of Africa, and of Malaya requires long and careful preparation. The Melanesian housewife, for instance, carries the taro roots home from the fields in the basket on her back. She then makes a roaring fire and peels the vegetables with a shell knife. She bundles the clean roots, wraps them in banana leaves, adds a second layer of about twenty taro leaves, and ties the whole bundle together with lianas. According to the size of her family and the number of guests, she may need a series of such bundles for an adequate meal. She often prepares similar bundles containing left-over peels and some young taro leaves for the pigs. After the fire has burnt down she removes the hot stones from the hearth and places the taro bundles in the smouldering pit, covering them with the hot stones and a layer of sand. After two hours the bundles are taken out, ready for the table once the wrappings have been removed. The pigs, as Krämer-Bannow tells us, impatiently expect their share. They are so well kept that their " tender, tasty meat is as fine as veal."

Another fundamental food plant of the South Seas is sago, the marrow of the sago palm, which is cut down, split open, and serves as a wooden mould in which the marrow is minced on the spot. With the help of an ingenious sieving device, it is washed and kneaded in a river, which carries away the floury particles and leaves the desired sago lumps. After drying, these are either baked into flat, hard bread or cooked into a jelly-like mush. For the preparation of the all-important coconut which furnishes ' meat ' and juice and oil, multi-shaped crackers, graters, and smashers have been invented.

What the cassava, the taro, and many similar plants like the bread-fruit, the mangrove, etc., are to other continents, the banana or plantain is to the natives of Africa. It is, indeed, the ' bread ' of the Negroes. Often it is roasted or made into soup or gravy. Banana flour is obtained from the green fruit, which is peeled, cut into pieces, and mashed. Pepper and salt are added, and dumplings are made which, cooked in water or palm oil, form the basis of many African meals. Meat, fowl, and fish of all kinds abound in Africa, where practically everything is used for food, from insects, rats, and alligator eggs to elephants and ostriches.

The main African meal is usually in the evening when the heat decreases. Friendly groups turn their gatherings into celebrations. There are dances and shows and music, and the story-tellers transform the black night into a colourful stage on which the figures of their imaginations go through strange adventures and mystical experiences. The Shilluk eat only after sunset and consider it a disgrace to eat during day-time under the bright skies.

One of the strangest African delicacies, especially of the west and the regions adjoining the Sudan, is clay or earth. Plischke remarks that " persons of high rank eat daily up to three such ' rolls.' " Fine, fat earth also is used for seasoning and is sold in roasted disks or granulated like flour.

Geophagy, which is the practice of eating earth, is found in many other places, including South America, China, and Indonesia.

The Tatu of California mix their maple flour with red clay. ‘ Stone butter ’ or ‘ mined flour ’ was eaten in times of need in Germany and Russia. During the seventeenth century the noblewomen of Spain developed such a craving for the tasty earth of Ertemoz that State and Church had to lay heavy penalties on this ‘ vice.’

The more palatable mineral known as salt is not known to all peoples. Many hunting and food-gathering tribes do not use it directly. They season their foods with plants and with the spicy ashes of certain woods.

On the other hand, some African tribes, who count salt among the most valuable possessions of man, go long distances to get it by trading and, if it is otherwise unobtainable, get it from the swamp plants by an exceedingly complicated process.

No people, however, can subsist without water, which may be ‘ seasoned ’ by the addition of cherished plant ingredients to turn it into a beverage fit for social occasions. Among these additions to drinking water tea is perhaps the most generally used. It is believed that it came from Assam to China, where its popularity grew from the fourth century A.D., although an ancient document has been found, dating back to 59 B.C., in which an obstinate slave is ordered in humorous verse to “ boil tea and fill utensils.” The earliest use of tea was for medical purposes. The leaves were eaten with rice, ginger, salt, orange-peel, and milk, and even boiled with onions.

Its stimulating qualities and its aromatic flavour make tea one of the most ‘ social ’ drinks of the world. Tea ceremonies belong to the most finely developed traditions of Asia. The indispensable tea of Paraguay, wrongly known as ‘ maté,’ the name of the calabash from which it is sipped with the bombilla, has especially stimulating effects. No party among the Indians would be complete without it.

What coffee, the other warm beverage that conquered the world, can taste like is known only to those who have sipped it in its native continent, Africa. Named after the southern Abyssinian province of Kaffa, from which it hails, its fifty species are now cultivated in most tropical regions of the globe. Only during the fifteenth century was the knowledge of it transmitted to Arabia and Java, and not until two hundred years later did it conquer the countries of South America and the rest of the world.

When a group of burnous-garbed Arabs sit down at their chess-boards to have a good time with the ‘ divine drink ’ no tea ceremony of Japan could outdo the tradition-honoured love with which the host prepares coffee in the African manner. The green beans are freshly roasted in a wooden bowl filled with glimmering charcoals. Each bean is individually removed with a wooden pincer and inspected. The roasted beans are then pounded in a wooden mortar with an iron pestle and the very fine powder is put in a vessel of water, which is brought to the boiling-point. It is then poured into an earthenware jug and blended with three to four other brews of coffee. After this intricate preparation the guests' cups are filled, and a fragrance of the *Arabian Nights* permeates the room to inspire the conversation of the appreciative guests.

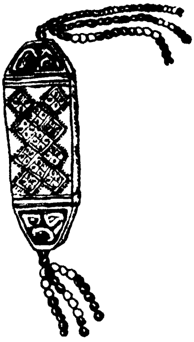
Chocolate is another delicious-tasting beverage which has gained wide popularity. Chocolate and cacao, from which it is made, are the cultural property of the Indians of Central America. They invented the drink from the *cacahuatl* beans of the *Theobroma cacao L.* shrub. When the white explorers reached the empires of the Toltecs and Aztecs they found not only the strange new beverage but also that cacao beans were used as coins. Some Indians even to-day use cacao beans as money, especially in Guatemala.

To make the beverage as the old Mexicans drank it, the cacao beans are roasted, grated, and pulverized on a stone slab and mixed with seasonings such as vanilla and pepper. Sugar was unknown, and only the wealthy could afford to sweeten their cacao either with honey or with the juice of the agave.

In 1520 the knowledge of cacao reached Europe with the Spanish conquerors. About a hundred years later it spread from Spain to Italy and to France, where it became tremendously popular. The sweetened, thickened mass known as chocolate conquered the world market only after the Dutchman, van Houten, had found ways to free the cacao powder of its heavy oils, thereby making the drink a much tastier one and easier to digest.

Although cacao is the classic drink of its native Central America, and although the plant is now cultivated in many tropical places, it was a beverage of primitive man only within a rather limited region and has not had large effects upon primitive cultures as a whole. Only the initiative of the white man and his business sense helped chocolate to its present position in the world market.

As pleasant as the enjoyment of a stimulating beverage is the habit of chewing some substance, the juices of which, together with the act of chewing, often have a soothing effect on the nerves. For the primitives of Melanesia, Micronesia, East India, and the Malayan Archipelago the chewing of betel from the areca nut is a supreme pleasure. Indian merchants brought the knowledge of this treat to East Africa, where it keeps the natives' jaws busy most of the time. As a gesture of hospitality, the welcome guest is offered a packet of this special 'chewing gum.' The packet contains a slice of the areca nut, powdered with lime or coral rag, and wrapped in a fresh leaf of the betel-pepper plant. It has a refreshing if bitter taste, but has the disadvantage of discolouring the teeth with a blackish tint and dyeing an addict's gums an unappealing brown colour. The habit of betel-chewing has produced a wide range of carved or otherwise fancily decorated containers for holding the favourite ingredients.



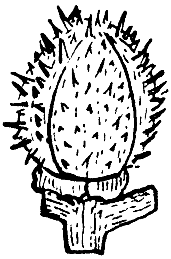
BETEL-BOX

Timor

After Hambruch

Similar lime boxes were carried around by the ancient Chibchas of Colombia, who were especially fond of another chewing stimulant, the coca. Long before modern science recognized the medical qualities of cocaine, which comes from the leaves of the *Erythroxylon coca* shrub, the natives of Colombia, Bolivia, and Peru chewed the bitter leaves with lime to experience the sensation of new vigour that it quickly produces. Especially in the white world, the over-indulgence in cocaine, prepared in more sophisticated and dangerous combinations, has led to most tragic results, which are counteracted by legislation in all civilized nations.

NARCOTIC DATURA PLANT



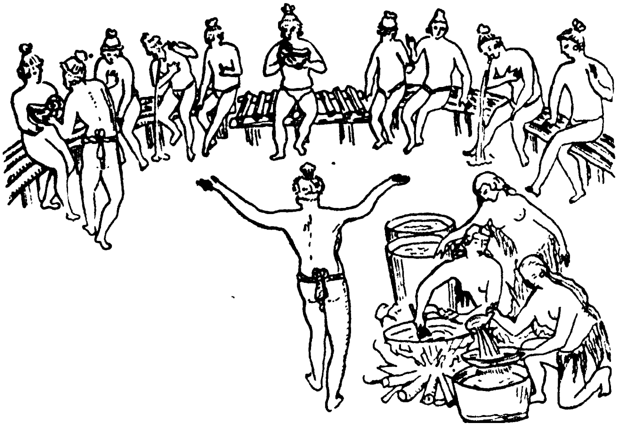
SPINY CAPSULE OF THE JAMESTOWN WEED

After W. E. Safford

Other famed stimulants that have caused much misery to entire nations are opium, which comes from poppy seed, and the dangerous hemp known since Marco Polo's times as 'the key to Paradise.' The word 'assassin' is derived from the name of the hemp addicts, the *hachichés*, who, during their rages of hashish drunkenness, were used centuries ago by the old Sheik al Chebel to kill his enemies. To anyone interested in hashish, Baudelaire's *Paradis artificiels* is a classic description of glowing, bizarre, and frightening visions described by a great artist whose own health was ruined by it.

The smoking of hemp and opium was probably known to the prehistoric Lake Dwellers, as extant implements indicate. Indeed, many primitive peoples had thorough knowledge concerning narcotic drugs derived from various plants—drugs which they ate, snuffed, or drank in concoctions.

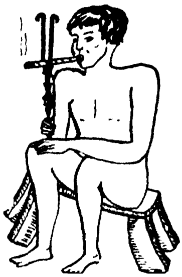
In the primitive world, however, the desire to let the mind sojourn in ' artificial paradise ' often had religious reasons. When tribesmen get together to enjoy the state of visionary drunkenness caused by a drug their gathering is mostly of a ritual nature. In some tribes only the medicine man knows the magic of the drug ; in others, the soldiers bolster their courage by artificial means just before a battle. Probably the only tribes of the acquisitive economic stage who knew opiates are the Australians, who use a woven container to hold the cherished pituri leaves (*Duboisia Hopwoodii*) which they chew to project themselves into a dreamlike state of mind.



SIXTEENTH-CENTURY REPRESENTATION OF THE 'BLACK DRINK' CEREMONY OF NORTHERN FLORIDA
After Le Moyne (1564)

In New Guinea *nonda*, a wild mushroom which makes the user temporarily insane, is eaten ' in times of great excitement.' Many American Indians are fully familiar with intoxicating drugs. Among the many species used by them are the ' Jamestown weed ' of the Zuñi, the *peyotl* cactus (used by many mystical cults on the North American prairies, in Mexico, and elsewhere), the narcotic *piptadenia* snuff, the ' black drink ' of Florida, and the notorious marijuana which figures so frequently to-day in American juvenile delinquency.

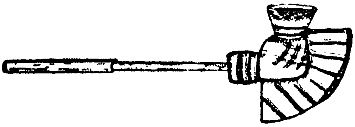
There is a difference between these drugs and the lighter stimulants, between excess and moderation. Only fanatics can deny the beneficial inspiration that comes to the human mind from one of the oldest providers of joy and friendly hospitality—tobacco. Its blue clouds have provided the touch of intimacy to any place where friends get together to exchange their opinions ; they have inspired many an inventor and philosopher with creative ideas in his quiet den. Even saints and monks have not resisted the silent company of a contemplative smoke.



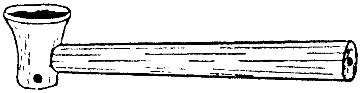
TUCANO INDIAN SMOKING CIGAR IN CIGAR-HOLDER

Modern scientists are not unanimous in their opinions about the origin of the tobacco-smoking custom. Although Lindblom stated in 1947 that "probably every one is now agreed that tobacco reached America from the Old World," many contemporary students of this question still believe with Nordenskiöld that "snuff, cigarettes, cigars, pronged cigar-holders, and tobacco-pipes are Indian inventions." Be that as it may, the first white men who came to the American continent were amazed by the native habit of "producing smoke

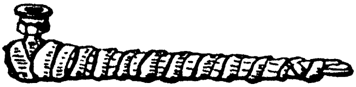
TOBACCO PIPES



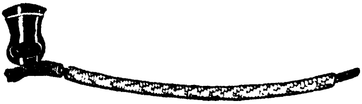
Cherokee Pipe of Black Stone



Tobacco Pipe
Wood
Pangwe, West Africa
After G. Tessmann

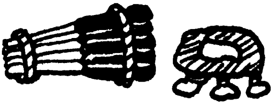


Pipe of the Yakuts
Museum of Ethnology, Hamburg



Tobacco Pipe
Clay
Pangwe, West Africa
After G. Tessmann

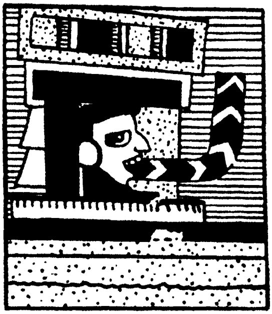
from an herb held in the mouth" and took the knowledge home with them. Early in the sixteenth century it was popular as a remedy against toothache, gout, and many other ailments. Jean Nicot, a French ambassador at the Portuguese court, introduced it to the royal circles of his country. He won fame as the inventor of the *nicotiana*, that 'healing herb' whose powderized leaves were given as a medicine to the son of Catherine of Medici.



BUNDLED CIGARS AND ASH-TRAY

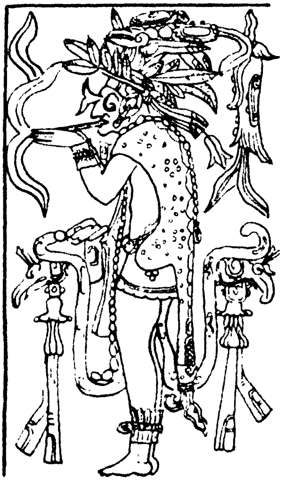
Codex Florentino
Mexico
After Sahagun

The use of tobacco for smoking became popular in Europe only at a much later date. Since then the controversies among the enemies of the 'devil's herb' and the friends of the 'breath of the gods' have continued through the centuries. Staal, one of the ablest historians of tobacco, is correct in his statement that " no other plant has influenced as extensively as the tobacco the economic and cultural life of all humanity."



MEXICAN SMOKER

Codex Vindebonensis
Mexico
Nationalbibliothek, Vienna



SMOKING MAYA PRIEST

Stone Relief at the Temple of Palenque
After Abbé Brasseur de Bourbourg

Tobacco was first used for ceremonial purposes, the Indian pipe of peace being the well-known example. The forms in which it is enjoyed vary widely, even on its native continent. There are the 'smoke rolls' of South America; the gigantic cigars (the word *cifar* is of Central American origin) held in place by huge carved forks by the Tucano Indians; the eating of the leaves practised by the California Chukchansi, the Gashowu, the Tachi, the Wukchami, the Yaudanchi, and the Yauelmani, among others.

Another practice is to mix the leaves with burnt mussel-shell powder, as do the northernmost tribes of the Pacific Coast. Drinking a concoction of tobacco in water is known in some places and, according to Kroeber, "the Chukchansi speak of being able to detect wizards after eating tobacco." The Labrador Indians appease the spirit of a killed bear with the offering of a ceremonial smoke of bark tobacco. Whenever the white man's smoking herb is not available the Eskimos depend on their own ancient brand, the *Atamaoya*.

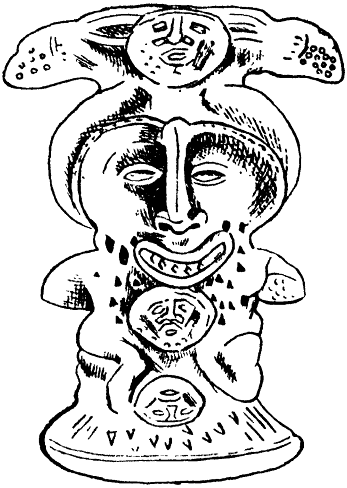
Many North American Indian tribes cultivate their own tobacco and trade it widely; others gather the wild varieties. It is the only plant cultivated by the Yurok, otherwise a non-agricultural people.

The reaction of the natives of other primitive regions to the introduction of tobacco is very varied. In New Guinea, where it is smoked as well as chewed, men, women, and children roll their own cigars from the traded or cultivated tobacco leaves. In contrast to this, the Ponape natives "never learned to appreciate the enjoyment of tobacco." Other Pacific Islanders prefer it merely as a 'seasoning' for their betel quid. The natives of Africa, however, have become regular addicts of the herb. Albert Schweitzer calls the Lambarene region "this land of the chronic nicotine poisoning," and states that women are even more excessive smokers than the men. Due to their over-indulgence, they suffer from insomnia and "go on smoking all through the night, to dull their nerves." An employee of the British-American Tobacco Company wrote about the East African Kavarondos: "We

WOODEN PIPE-BOWL
Haida Indians
Museum of Ethnology, Berlin

6

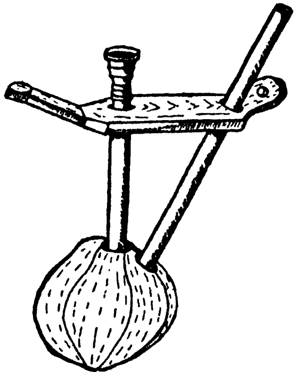
packed our cigarettes in boxes of four, because the Kavarondos smoke four at a time, putting one in each corner of the mouth, and one in each nostril."



PIPE-BOWL
Clay
North Cameroons
Museum of Ethnology, Cologne

The Pangwe cultivate four varieties of tobacco. The Nuer 'improve' the taste of tobacco by added mixtures of ashes and cow-dung, and smoke the blend in enormous clay pipes with pumpkin bowls. From the simple tubular pipe to the red and black North American models carved from the 'holy pipe-stone,' to the richly decorated clay, slate, and wooden pipes of the world, receptacles for the 'divine herb' have been shaped by all peoples in manifold varieties. Many African tales explain the origin of tobacco as a supernatural gift of the black man's gods. The glowing pipes of the jungle belong to the very conception of the enjoyment of life at its best.

Among the tobacco pipes of the high cultures the water pipe of India, China, Persia, and Arabia is perhaps the most picturesque. It is an apparatus consisting of a water-filled container, usually a coconut or an ostrich egg-shell or a clay or porcelain vessel, topped by a tube carrying the tobacco-filled pipe head. The user inhales the cool water-cleaned smoke through a special mouthpiece attached to a thin tube which is connected with the container. Groups of Mussulmans like to sit together in the evening in the shade of their yards, discussing the world and themselves while peacefully sucking the smoke, often from different tubes all attached to one narghile (from the Persian *nargil*, 'coconut'). The Arabian and Indian water pipe, the hookah, has found its primitive imitators in many regions of Africa.



HOOKAH WATER-PIPE
Africa
Museum of Ethnology, Leipzig

When we think of a group of men smoking and having a good time the picture of amicable exchange of thoughts and of tall-story telling is incomplete without one of the oldest lifters of the spirit—a container filled with an alcoholic beverage of some kind. Alcohol is by no means a product of civilization. The apéritif served on a silver tray in the cafés of the Champs-Élysées, the whisky of the English clubs, the wines of the Moselle, the Rhine, and the Champagne—all have their forerunners in the beers and wines of the primitive agriculturists, and in the fermented milk drinks of the early herdsmen.

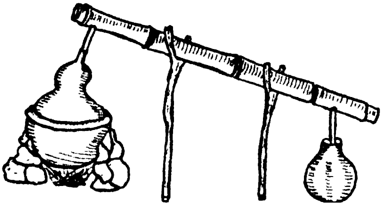
The making of alcohol requires the discovery of the process of fermentation, which probably came about in a relatively simple way. Perhaps some primitive who had crumbled his bread into a container filled with water noticed, the next day, bubbles rising to the surface and a solid substance at the bottom of the vessel. Tasting this 'water,' he found himself getting into an unusually merry mood, so he decided to go further into the matter. Another savage might have cut the stem of an agave, and after drinking its juice carried the rest home in his calabash. A few hours later, observing that the juice in the container had undergone a change, he tasted the stuff and found it worthy of investigation.

EUROPEAN 'BAR' TOWARDS THE END OF THE MIDDLE AGES
After Hans Sporer (1498)

All alcoholic beverages fall into two general types : wine, in which the alcohol is created directly from sugar, and beer, in which the alcohol is produced from sugar by the addition of starches. A side branch is the fermentation of lactose (milk sugar) in the milk drinks of the herdsmen.

Among the wines of primitive tribes palm wine is one of the most widely known varieties. Often, the trees are cut down and their crowns raised on a supporting structure. All along the upper surface of the trunk, openings the size of a child's hand are cut. A small fire is started beneath, and the juice accumulating in the openings is collected in calabashes. It is then put in containers which are covered, stored away, and left for fermentation. After three to four days the beverage is ready for consumption, and the drinking bouts which are just as popular in the jungle as in our cocktail lounges can begin. In tropical climates the juice drained off in the morning ferments by noon and foams over the top of the container. The fermentation is caused by yeast germs from the air. They change the sugar of the juice into alcohol and carbonic acid. The substance which settles at the bottom of the container is yeast.

Many African tribes obtain their palm wine without felling the tree. They climb and tap the tree at the top, where the juicy young shoots come out. This is done in the evening. In the morning, by which time the drink is ready, the calabashes in the trees are a welcome sight to the thirsty—the innkeeper's sign in the jungle. The yellowish, effervescing palm wine of the Pangwe has " a strange fine flavour which one never forgets."



STILL FOR THE DISTILLATION OF PALM-WINE
Moluccas
After Martin

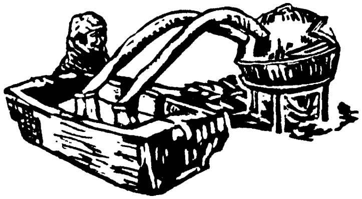
Pulque, the forerunner of which was the *octli* of the Aztecs, is made from the huge shaft of the agave flower. Many North American Indian tribes brew their wine from cactus plants, like the Papago who use the saguaro fruit and during wine time have a series of elaborate festivals during which the medicine men perform rain magic. Maize, sweet potatoes, manioc, and sugar-cane furnish the drinks for the celebrations of all tropical merry-makers.

The Khonds of India make their wine from the *salopo gaxo* palm-tree, which furnishes twenty to twenty-five litres of wine daily ; during blossom-time they " do nothing but drink." It is the time of boundless merry-making and dancing. The *Meginakan* festival of Borneo is an elaborate affair which only the wealthy can afford. Their *nassi* wine is obtained from rice. Gongs are beaten when it is ready, and pigs and fowl are prepared in huge quantities to feed the celebrants.

Beer is a favourite drink of the Apache, who obtain it from mescal tubers. The Neoze of eastern Bolivia brew it mostly from wild honey, maize, or yucca. Some tribes speed up the fermentation by kneading ; others by chewing the ingredients.

African brewers are even more numerous than the wine manufacturers. Every one who has ever penetrated the Dark Continent has been invited to join the happy celebrants of whole villages in native ' beer gardens.'

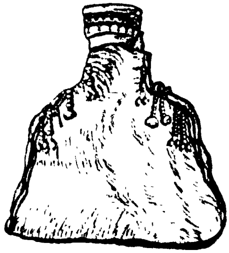
The customary beer of the primitive Himalaya tribes is the *maruwa*, obtained from millet and other grains. Their " steins," in which the beverage is brewed, are bamboo sections with banana leaves for covers. The drinkers sip it with small tubes and fill the container again and again with hot water, until the brew has lost its stimulating qualities. The Buddhist monks, not unlike their colleagues in other parts of the world, are the most expert brewers of this beer.



KIRGHIZ STILL

After K. Weule

The invention of distillation, which results in beverages with higher alcoholic content, is a matter of speculation. Perhaps the rays of the tropical sun, heating a vessel containing wine, caused small drops to accumulate on the inside of the cover and these drops were found to be of a more concentrated nature than those in the container. With the elongation of the cover and the addition of a cooling system for the alcoholic vapours, the distillery apparatus was created. This is the way the natives of the Moluccas make brandy from palm wine. Java, Siam, Ceylon, and the Malabar coast are the regions where more intricate distillery apparatus have led to the manufacture of multiple types of brandy.



KUMYSS-BAG

Horse-skin
Yakuts

After A. Byhan

Missionaries of the year 1253 mention the famed *kumyss* brandy made in the immense territories from the Buryat Mountains in central Siberia to northern Tibet and in the Kirghiz region. Marco Polo tasted it on his travels. Abul Ghazi described it in 1251 as " clear like doubly distilled corn brandy." *Kumyss* is made from the milk of camels and donkeys and is fermented with lumps of butter.

Tales and poetry of primitive man are full of witticisms about drinking and drinkers. The Haya proverb that " the beer made by naked men is drunk by the dressed up " has a touch of social criticism—the rich enjoy what the poor produce.

The Kpando of Togo have the habit of flattering each other when their calabashes make the rounds. The last drops of drink are poured on the ground, and the guest gives his own drinking name, to which others add complimentary remarks. He may say " *Da tso mo* " (The snake crosses the path), to which the others add, " *Medzina kpo o* " (He is not afraid of the stick !). Another's name may be *Klongo* (Turtle Shell), to which his friends shout, "We are old turtle shells!" (No insect or small animal can hurt this smart creature, protected by its shell.)

There is wisdom in this drinking song of the Dusun of northern Borneo:

Large is the pool outside,
We don't get headache—
Small is the pool in the house,
And we get the headache.

They may drink from a pool of water in the field, explains the explorer Staal, without feeling ill effects, but the little pool in the house, namely, the vessel filled with wine, gives them a headache.

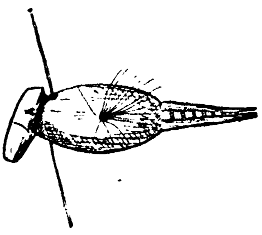
Indeed, since the times of Anacreon and Li-Tai-Po, the song of the wine has been sung by the poets of all ages. The Aztec god, Xipe, was known as 'the Nocturnal Drinker.' The drinking of *pulque* was restricted in the oldest times to the venerable 'old men and women,' except during the great Tecuilhuitontli feast, when all men, women and even children were allowed to enjoy it without restriction.

Four different kinds of beer were brewed in the Egypt of 2500 B.C., and the story of the 'divine' origin of the beverage dates back to 4000 B.C. One ancient tablet covered with hieroglyphs reads: "Do not let the drinking of beer overtake thee, thou falleth and breaketh thy bone and none tends his hand to thee, thy companions keep on drinking and say, 'Away with him who is drunk!'" How similar are these words to their modern version heard by the author in a small American Negro church: "Do not be a can which the Lord opens only to find beer in it!"

The excessive consumption of beer seems to have been common among Egyptian students, judging from what a scholar wrote to his pupil long before the birth of Christ: "I am told that thou leaveth thy books and thou abandoneth thyself to pleasure; thou goeth from street to street every evening while the smell of beer chaseth men away from thee and ruineth thy soul. Thou art seen climbing walls and breaking into houses; people flee from thee and thou injureth them."

However, we would not do justice to the good times enjoyed by the members of the human race if we should consider eating, smoking, drinking, and the like as the only elements of joy and entertainment. Dances, games, and sports events are often held for the sake of their own virtues, and the generally playful attitude of primitive man expresses itself in many activities of a thoroughly sober nature.

Even the primitive child comes into its right. All peoples on earth brighten their youngsters' early years by the invention of toys, which are created either for the sake of play alone, or for an educational purpose. The African Pangwe children play a 'marble' game with round pebbles. Palm nuts are their ninepins. They have dolls, pea-shooters, whipping-tops, string-pulled puppets, magic games and puzzles, stilts, diminutive crossbows, animal traps, and drums. They pull tows and run races—in short, they have all the possessions a happy child could ask for.



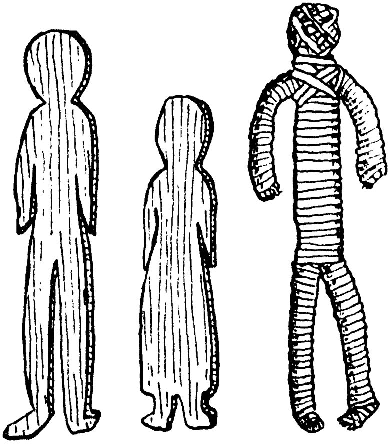
WOODEN BIRD 'DANCING' ON BOW-STRING

Toy from the Santa Cruz Islands

Museum of Ethnology, Basle (after Speiser-Foy)

As for the dolls of the wilderness, the models made by the Choroti Indian women for their little girls are among the strangest. Often the head of the doll is so tiny that it is hardly noticeable, and consequently they distribute the face tattoos all over the body. Since the children of the wilderness

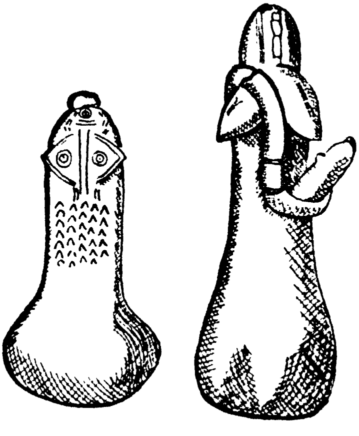
DOLLS



Dolls of Elm Bark and Willow Withes

Chippewa Indians

After F. Densmore



Clay Dolls of the Choroti Indians

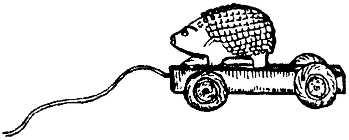
'Woman' 'Woman with Baby Girl'

Rio Pilcomayo, Bolivia

After Nordenskiöld

are accustomed to the sight of the naked human body these dolls leave nothing to the imagination.

Equally realistic were the dolls of ancient Egypt, which featured movable arms, and wigs of woven hair, interwoven with tiny clay balls in imitation of balls of grease typical of the coiffures of the Nubian housemaids. Another favourite toy was ‘ the baker at work,’ a movable human figure mounted on a board. When a string was pulled the man moved a lump of clay back and forth, ‘ kneading the dough.’ Dolls’ houses with tiny furniture including mirrors and movable chests of drawers were built for the Egyptian offspring. They had animals drawn on strings ; crocodiles with movable jaws. Preferred animal pets were monkeys and birds like the hoopoe, with its spectacular head-dress.



TOY HEDGEHOG
From the Ruins of Susa,
2000 B.C.
Louvre, Paris

The games of the grown-ups all over the world are as manifold as human imagination itself, with perhaps dances predominating. But even very primitive tribes, like the Australians, feature wrestling matches, spear-throwing contests, ball games, and, expecially, the string games which are also known in Polynesia, America, Africa, and many other places of the world. All parlour games we can possibly imagine have their primitive prototypes and equivalents, from memory games to games played on boards and often based on chance —games which can ruin a man in primitive currency as easily as the white man’s horse - races. Perhaps the best known of all these games is the *mankala* game, common to practically the entire African continent.

GAME BOARD
Pangwe, West Africa
After G. Tessmann

The Ubangi tribes, who are fanatic enthusiasts of the *kuka* game, lose loads of cowrie money snails during their feverish sessions, which are exclusively ‘ stag ’ affairs, because, as the explorer Leyder puts it : “ The women do not play. They haven’t got the time.”

Some primitive tribes even play games at funerals. The spirit of the deceased is supposed to take part in determining the winner and the loser. This custom is especially developed among South American Indian tribes. One such game has been very vividly described by the ethnologist Karsten :

> The rest of the night is spent in playing another kind of game, with burning balls of cotton. Upon the board which was placed on the stomach of the dead Indian a small cotton ball is made and set on fire. The playing men arrange themselves on both sides of the corpse and blow the burning cotton hither and thither upon the board, keeping the small ball in constant motion. Each player who finds the ball in front of himself immediately blows it to the other side, from where another player blows it in another direction, and so forth. The aim of the game is to nullify all dangers of contagion proceeding from the dead body, since it is feared that the disease-demon may carry off other persons among the relatives surviving.

This sombre purpose, however, does not prevent the participants from full enjoyment of the fever of the game. The general South American custom of making a feast for the living out of the memory of the dead is strong even in to-day's modern cities. There is not much difference between the ' food offered to the dead on the Day of the Souls ' by the Quiche-speaking Indians of Ecuador and to-day's modern Mexican habit of selling candy skulls with fancy sugar decorations on the streets on the ' Day of the Souls,' gifts fondly exchanged by lovers, with their initials in sugar on the top.

The frigate bird of the South Seas also furnishes many opportunities for joyous sports. Although its keeper is a ' holy ' man, who wears his feather bracelet as the mystical ' husband ' of the spirit of the soul bird, as the Doge of Venice wore a ring as husband to the sea, the frigate-bird worship is a popular sport, especially among the islanders of Náoero. The birds must first be tamed. Property marks indicating their individual owners are cut into their wings and tails so that they can be easily recognized while in the air. The whole neighbourhood gets excited when a new bird has been tamed. ' *Öréita ména* ' (' Now he begs ') is a call of joy. The owners carefully feed the birds with fish, and give them drinking water from their own mouths. When they are tame enough to be attached permanently to their masters they are let free again. Then they can take part in contests with other birds, in which the height of their flight and similar skills are judged.

Most birds of the islands—and there are many species—are tamed and trained by the native sportsmen. Among them is the nocturnal *édeṙakui*, whose name has become the nickname of native Don Juans. Cock-fights, pig-fights, and fish-fights are the order of the day. Although dragon-flies are ' reincarnations of the departed,' the children tame them and keep them near home on a branch of a tree, from which they attack any fellow dragon-flies flying by, to the great joy of the onlookers.

This type of game is a regular sport, but in primitive pastimes the border-line between play and sport is often hard to draw.

The simple sport of walking is not popular. It is too natural to be noticed. Even if primitive hikers, often heavily laden with bulky packs, walk great distances over difficult terrain, they are not considered to have achieved a record. Running also evokes little admiration. It is too necessary for earning a livelihood to be regarded as a special sport by peoples who run a game animal to death in steady pursuit, like the Australians, the Bushmen, and the Hottentots—with whom, Peter Kolb reported in 1719, no man on horseback was able to hold pace. Other extraordinarily gifted runners are the Tarahumare who live in the Sierra Madre Mountains of northern Mexico. They are recognized even by other tribes as *ralamari*, or runners. They can run distances of over two hundred miles without stopping. The Geri, who live on Tiburon Island in the Gulf of California, can run a strong deer to death. They are able to catch up with a galloping horse within a short time. They train from earliest childhood, and their slender, well-proportioned bodies and the sheer love of their own strength make such performances possible.

Climbing, in which similar astounding records are set, also is not recognized as a sport in primitive societies, although the climbing abilities displayed in reaching fruits in the tops of tall trees, taking eggs from birds' nests, cutting wild honeycombs, etc., are often so impressive that even onlookers of similar skill reward their best men with expressions of special esteem.

The sport that most attracts primitive fans is high jumping, which the Watusi of East Africa, a tribe of exceptionally tall and slender build, consider the expression of admirable virility. No young man who cannot jump as high as his own body measures is accepted as grown up. Using low termitaries and similar objects as jumping boards, they reach heights averaging eight feet without effort.

The throwing of objects is the favourite sport of many peoples, with the stone perhaps the oldest discus. The sure hands of these skilled hunters and the very nature of many of their weapons train them to early mastership in this sport. The connoisseurs among the North American Indian spectators value the finesse of the player and his skill and versatility much more highly than the actual strength he displays. Pieces of sugar-cane, beaver teeth, nuts, or lumps of clay are used as darts, and fixed rules determine the course of the play, in which two groups compete against each other. Among the Zuñi the *showialtowe* dart game is of ceremonial significance, its equipment being consecrated on the altar of the war god, the patron saint of the game.

The boomerang, that ancient hunting and sports tool of the Australians, migrated also to other parts of the globe. It is found among some North American Indian tribes, in India and in Egypt, where whole army divisions were equipped with it until the end of the nineteenth century. The spear duel, often customary as a method of deciding inter-tribal feuds, is regarded as a supreme expression of sportsmanship in the Fiji Islands, in America, in Africa, and in New Guinea.

Among the sports which are a source of joy to the high cultures, as well as to the most primitive tribes, are wrestling matches, which draw thunderous applause everywhere, from Australia to Brazil, from Africa to Finland, from Polynesia to the Caucasus, from south-east Asia to Japan, where the *sŭmotori* rank among the national heroes.

Boxing is equally cherished in all forms of civilization. The native king of the Tonga Islands ordered boxing matches to be held at regular intervals by his subjects. The primitive boxing glove is either non-existent or is a thick string padding. On the Mortlock Islands shark's teeth turn the boxing hand into a dangerous weapon—the man who falls down first is the loser. Even umpires are known at primitive sporting events. In Hawaii he interferes when unfair moves are made, or when the fight lasts too long. He separates the fighters with a wooden stick.

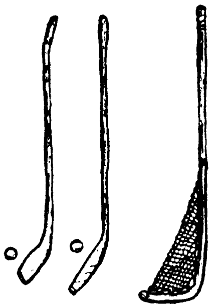
Swimming is not regarded as a sport, but surf-riding on wooden boards leads to keen contests on the Polynesian Islands, the winner being the man who first reaches the beach without toppling over.

Perhaps the most popular sport of all is the ball game, that age-old favourite of Indians, Negroes, Europeans, and Egyptians. Most of our well-known games have their roots in primitive tribal ball games. These games often had magical or symbolic meanings—an evidence of their venerable age.

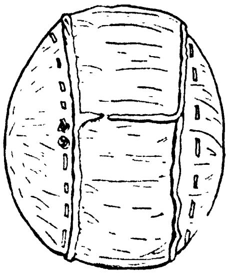
When the whaling season draws near, the Makah Indians play hockey with a whalebone for a ball and a bat symbolizing the war-god's club. In an ancient Aztec codex, the gods of light and darkness play ball with each other ; and it was one of the duties of the ancient Mexican rulers to watch, at midnight, the stellar constellation of Ursa Major, known to their people as the ' ball-play arena of the stars.' Ball games, especially of the North American Indians, are so various that they are worthy of study in themselves.

Lacrosse and other two-goal games, such as shinny and pogatowan, use balls of different sizes and shapes. Most often they are made of soft leather such as deerskin, and stuffed with grass or plant fibres. The prototype of the European soccer ball is the football of the Eskimos, made of stuffed hide and about the size of the college model.

The balls of ancient Egypt consisted of two hemispheroidal shells of leather or fine linen, stuffed with straw or finely cut reed and sewn together to form a ball of about four inches in diameter. Smaller balls of multi-coloured siliceous earth were very fragile and brought out the dexterity of skilled players.



(1) SHINNY BALLS AND STICKS
Mono Indians
(2) RACKET
Passamaquoddy Indians
Field Columbian Museum



'KICK BALL'
Mandan Indians
After F. Densmore

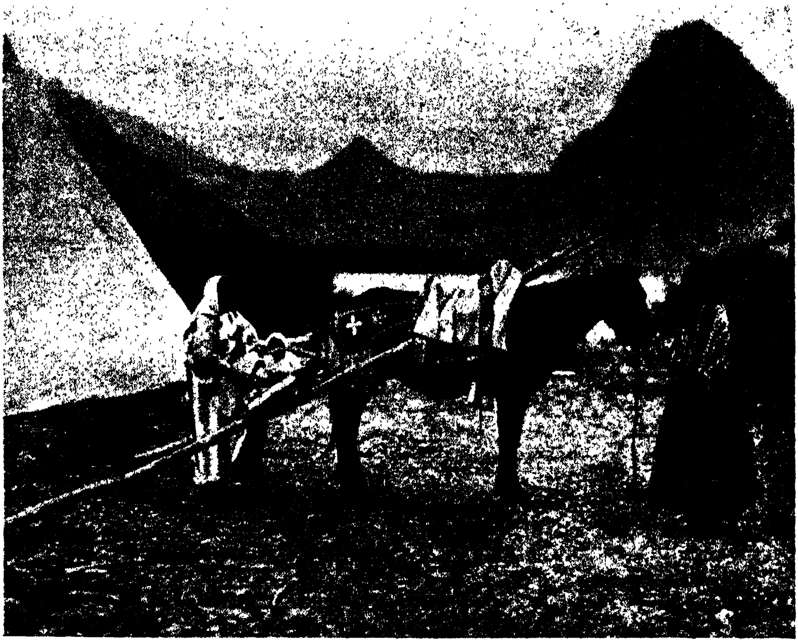
The difference between mere pastimes or entertainment and regular feasts and celebrations was sharply developed in the high cultures. Victory celebrations, anniversaries, weddings, religious and national holidays are held at set dates and can be determined in advance, a mental and time-conscious approach which is completely alien to the primitive mind. All the different ways in which the general, spontaneous, and indefinite good times of the children of nature express themselves informally are co-ordinated in the great official celebrations of the classic and pre-classic times. Pompous parades, dances, shows, games, eating and drinking feasts are combined in great celebrations. These celebrations are sanctioned by Church, State, and society.

The Chibcha divided their year into three well-defined parts, one of which was dedicated to feasts. For the Mohammedan, the time of joy begins after the Ramadan; for the Catholic, it ends with Ash Wednesday. The feasts of civilization have been co-ordinated by plan. Whoever the host—family, group, club, government, Church, or nation—planned and purposeful convention has entered our merry-making. This may make our parties and feasts more glamorous, but whether it allows them to equal the spirit of gay improvisation, the hilarious joy of being happy for the sake of happiness that characterizes the blissful gathering of the jungle and of the prairies, we may well wonder.

CHAPTER SEVEN

On the Roads of Land and Water

When our gleaming cars whiz over the highways, when our railways carry speed-breaking trains to their destination, a feeling of high achievement often inflates the ego of the modern traveller. We are ' going places.'



BLACKFOOT TRAVOIS

American Museum of Natural History, New York

Yet, although the vehicles of our travel and their speed would, even a century ago, have seemed fantastic, the use and construction of roads which bring the immense distances of the globe closer together—the roads of strategy and of trade—belong to the oldest achievements of mankind. The necessity of using an important trail again and again, whether it was the path to the next water-hole or the caravan route over mountains and through the desert, has created streets of venerable age. When a path was cleared through jungle growth, rocks, trees, and other obstacles, precious time could be won. The places where food and water abounded could be reached more quickly, and travellers were protected on their journeys to the trading places. The danger of being lost in the wilderness was considerably reduced when directions were confidently marked by roads ; neighbours could be visited and new areas explored. The great migrations of peoples and the transmittal of cultural elements were facilitated by the roads. Roads are the great symbols of peace or war, the bonds between men and ideas since the dawn of time.

Along these all-important arteries the traffic between tribes and peoples, between villages and markets, between the coast and the interior, pulsed in the olden times as it does to-day. The story of the great roads of history is the story of history itself.

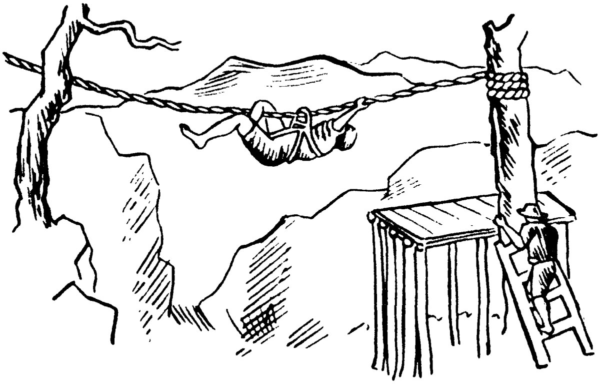
In Africa the caravans and safaris have moved from Lake Chad and Timbuktu to the North Coast, from the Nile and Niger through the Sudan where Sokoto, Kano, and similar centres of trade attracted the merchants. Legendary is the ancient road from Egypt to the Columns of Hercules. The entire Dark Continent was and is to-day lined by a network of trails from the Mediterranean to the interior.

In Europe the Danubian culture of prehistoric times sprang up along the banks of the proud river and became the centre of cultural exchange through the millenniums. The ancient ' salt streets ' of Europe which enabled the distribution of the mineral from the mines to the trading centres of the interior have maintained this name even to-day—Reichenhall and Halle on the Saale were their terminals, and the Danube, the Elbe, and the Loire were their trade routes.

In Asia Minor the road from Baghdad to Basra is of immortal memory since the tales of the Arabian Nights ; and on the roads between the Ural Mountains and the Caspian Sea waves after waves of migrating peoples streamed into Europe. Marco Polo's travels followed the ancient ' silk roads ' from Samarkand to the Hindu Kush, from the Gobi to Peiping. On these silk roads the precious Chinese fabric moved from Central and Anterior Asia into the Roman Empire. Trade relations between them began in 114 B.C. Ptolemæus reports that the travel from Liangchow, then the capital of China, to the Pamir Plateau took seven months.

In America the great trading expeditions of the Mayas moved every year over great distances. The natives even mapped the famed road from Xicalano, through the primeval forests to the gold regions of Honduras, on which Cortes moved during his adventurous expedition of 1524-25.

Primitive trails are not so spectacular, but they are certainly equally old or older. Having more the character of direction markers than of roads, their course is largely determined by the difficulties of the country; they wind through the continents in short cuts and mountain passes, as the terrain allows. The covered wagons of the American pioneers travelled the ancient trails of the red man; many state and federal highways follow old Indian paths. The Louisiana road from Chinuba to Lake Pontchartrain is still known as the Indian Road, and a highway in Colorado is laid on the Sante Fé Trail.



TOW BRIDGE

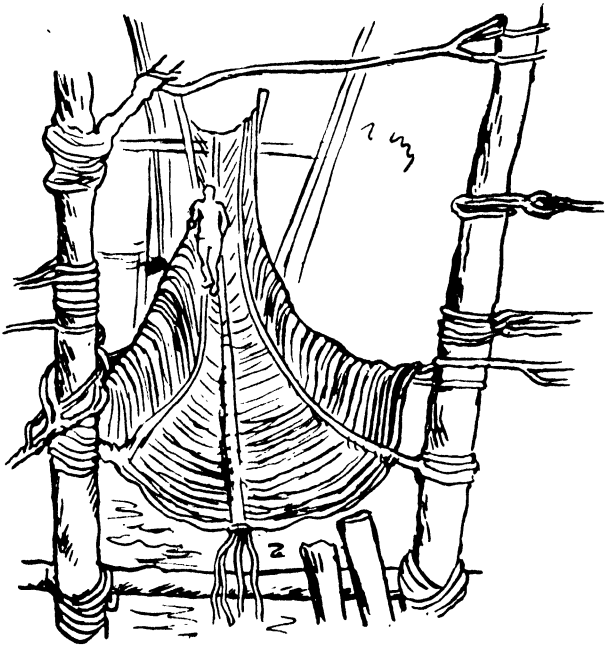
Peru

After K. Weule

We saw that the great rivers of the earth are important determinants in the migrations of goods and men. The names of the Nile, Hwang Ho, Euphrates, Tigris, St Lawrence, Missouri, Mississippi, and Amazon are closely related to the history of mankind through the millenniums. The river roads stimulated mercantile exchange and created cultural centres. The rivers of the Lower Congo have transformed whole tribes into trading peoples—a phenomenon repeated all over the globe.

To connect these mighty water roads by the building of canals is one of the earliest architectural achievements of man. Great was the fame of the Emperor Yang-ti (605–618) whose experts constructed the glorious Emperor Canal. In the regions of the Amazon early efforts solved the problem of the annual floods by building numerous canals, especially in the Mojos province, and modern scientists are inclined to believe that the mighty waterway between the Orinoco and the Rio Negro is the work of human hands.

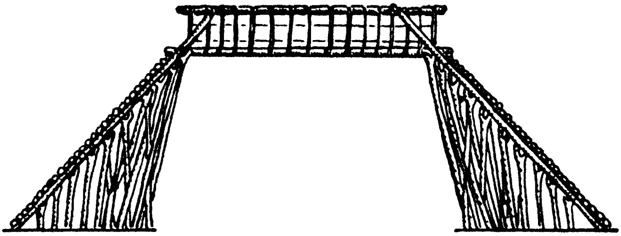
While rivers and waterways may connect countries and peoples, they are often apt to hinder the traveller who must cross them to reach his destination. To overcome this drawback, and so extend roads even over intersecting waters, man invented the bridge. Primitive tribes have worked out many methods of getting over rivers and abysses, methods which vary from the simplest devices to structures of great technical complication and stability.



LIANA BRIDGE
Guatemala
After Sapper

In the rocks of the Himalayas primitive herdsmen have hollowed out holes in which the traveller inserts bamboo rungs to climb either upwards or downwards, slowly and perilously. Bamboo canes may be used to bridge an abyss. Tows of yak hair are affixed from tree-tops on opposite sides of a stream and used like bos'un's chair rigs, with the traveller hanging from a stick or small woven seat attached to the tow. The tow bridge fixed on both sides of an abyss is a customary device used by Peruvian Indians of the Andes. The Aymaras of South America build floating bridges ; the Huari balance forward on bamboo poles laid across a stream, and the Quiche use cantilever constructions. One or two lianas, spanning a river, are used as bridges by the Botocudos and Siriones.

Among the finest achievements of primitive bridge builders are the famed interwoven liana bridges of complicated structure which can be found as a cultural property of many tribes of Melanesia, Africa, South America, India, and Indo-China. Such web-like bridges are solidly interwoven and have the shape of a long, semicircular basket, the sides of which reach to the hips or shoulders of the passer. Trees or poles rammed in along the shore serve as anchoring posts for the liana bindings which are often also attached to rocks or tree trunks protruding from the water. A firm rail prevents the traveller from being swept off his feet by the current.

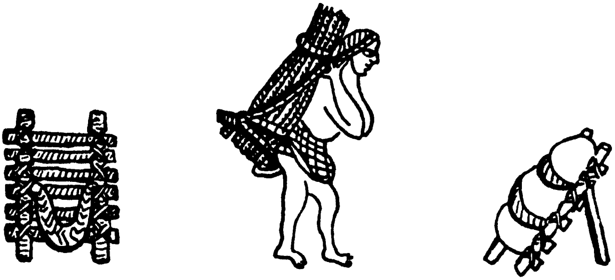


POLE BRIDGE
Chibcha
After Bolinder

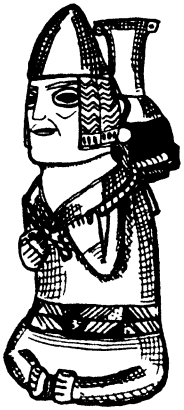
The simplest wooden bridge is naturally the felled trunk laid across a small brook, but when the river is broad magnificent timber structures are erected, with complicated spans balancing over forks and poles. In the Cameroons, in Melanesia, and in Colombia the intricate shapes of such structures are surprising in their symmetry and architectural beauty.

Over land and water, over trail and bridge, thus travels man, to carry himself and his goods and provisions to his place of destination. For mountain-climbing, walking canes are customary, but in regions where the great wood-carvers live, for instance in Africa and on Borneo, simple staffs soon assume more pretentious shapes and become insignia of rank or even expressions of magic powers.

When it comes to the carrying of loads, there is no people on earth which does not know of some method to make burdens easier to handle. Head loads may be supported by woven rings or by stuffed pads, and the weight of the burden carried on the back may be conveniently distributed over the entire body by the carrying strap, head-band, or tump-line. This carrying aid is especially typical of Asia and of the North and South American Indian tribes, but it also occurs in Africa. Mostly, the tump-line is attached to a basket supported on the back, or to a ladder-like structure such as the *cacaxtli* of the ancient Mexicans, whose head-band was called *mecapalli.*



AZTEC CARRYING DEVICES
After Codex Mendoza



CLAY VASE, SHOWING CARRYING METHOD OF CUZCO AMPHORA
After Bässler

Burdens on the back are not necessarily lifeless — the Asiatic and North American manner of carrying babies on the mother's back is comfortable for both. South American Indians often prefer to carry their babies in a broad woven band slung round the mother's shoulder, but they also use ladder-like frames into which the baby is laced during the mother's wanderings. The large amphoras of the Incas featured two special handles near the bottom, through which strings could be slung to make it possible to carry the huge vessels on the back, instead of in the customary manner—on the head. But while in earlier cultures the human beast of burden is a general sight, since the carrying of heavy loads is the lot of all mortals, the feudalistic caste of the ancient high cultures look down upon their poorer brethren of the burden-carrying lower caste. Many a noble Singhalese wears curved combs

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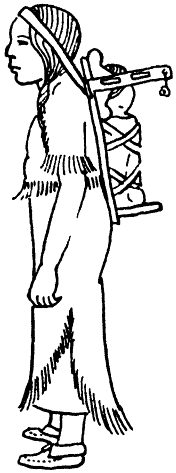

INDIAN WOMAN CARRYING BABY ON TUMP-LINE

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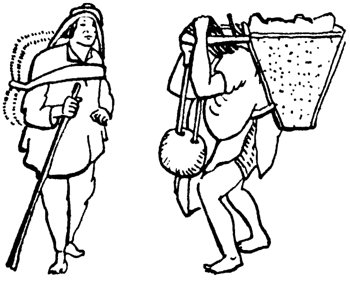

THE TUMP-LINE IN ALASKA AND MEXICO

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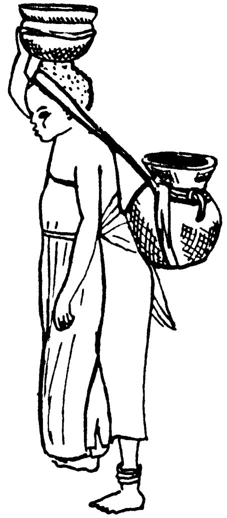
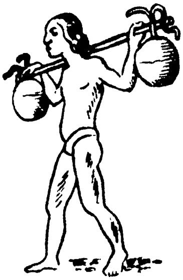


MOBALI WOMAN CARRYING WATER

Belgian Congo

American Museum of Natural History, New York: (2) *after drawings* (3) *after a photograph*

on his head to demonstrate that his people have never borne burdens on their heads.



'COOLIE' YOKE

Mexican Indians

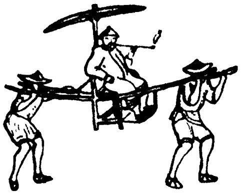
After Oviedo

The simplest hand luggage is the carrying net known to very many peoples, especially in America; leather bags are its equivalent in Africa and Asia. The braided and woven bags and baskets of all kinds, the conical burden baskets of Asia and America, and the square, stiffer African varieties, all serve the same purpose: to keep goods together and to facilitate their transport.

The carrying beam or 'coolie' yoke is of very ancient origin. It consists of one long piece of strong wood balanced on the neck and counterweighted by loads suspended at either end. Since the weights of these loads must be equal for the sake of balance this device is best suited for water-containers of identical shape and size or for identical bundles. Its classic place of origin is Asia, but the discoverers of South America found it among the natives of some parts of that continent; and Nordenskiöld tells us of the sufferings of the Indians when the Spaniards forced them to carry loads on their back rather than on the yoke as they were accustomed to do.

The beam, on which two or more men carry between them a suspended load, applies another technical principle and allows the easy handling of all kinds of heavy objects, from the carcasses of hunted animals and heavy signal drums to the bodies of the departed. This method of transportation is common in Africa, Asia, the South Seas, and some South American regions.

The privilege of being carried about by one's fellow-men is enjoyed only by rulers, dignitaries, and persons whose sight is to be hidden from their surroundings for some reason or other. The litter in which such distinguished riders are carried was developed from the carrying beam. A settee or hammock is attached to two or four poles which are supported by the footmen. In Africa, where great stress is put on any device accentuating the dignity of the mighty, litters are still the favourite travelling 'coach' of the chieftains, princes, and the mighty whites; and in China it is the privilege of high officials to be carried about in this fashion. In the Chinese South it is the traditional mode of travelling for all who are entitled to higher standards of living.

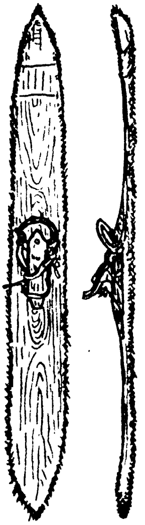


CHINESE BAMBOO LITTER

After K. Weule

In another region of the world the caciques of the Chibcha were thus carried about in hammocks by their slaves. The reigning Inca of Peru was so 'holy' that none of his subjects was allowed to see even his face. To protect his godlike countenance he travelled in a closed litter, preceded and followed by runners, who had to remove all obstacles from his way. The 'curtain before the throne,' which originated from the same conception, is a sacred tradition of Egypt, Abyssinia, and other African regions as far south as the Pangwe. This desire to hide the face of sacred or revered persons developed the litter into the sedan chair, a closed compartment carried in the ancient way. It was in common use from the times of the Babylonians and Egyptians to classic Rome, where especially the noblewomen travelled in this fashion. After the Crusades it penetrated the rest of the Occident, where it became fashionable during the seventeenth century as the *porte-chaise*.

The motive power in all these cases is the human body—and the weight of the burden falls most heavily on the foot. Although not many primitives of the warm zones feel the necessity to protect their feet from the strain of walking, the desire to improve their speed or to make their footprints as indistinguishable as possible led to the invention of multiple kinds of primitive foot-gear. There is reasonableness in the view of the ancient explorer Mason who calls the shoes, sandals, and moccasins of primitive man the first actual means of transportation. Where the sand of the desert is too hot to be touched with naked soles, or where sharp stones would cause injuries, protective foot-gear is customary. For instance, the Indians of the torrid Roroima region manufacture sandals from the leaves of the Mauritia palm. Perhaps the most ingenious variety of the primitive sandal is the sprinter's model of the South African Bushmen which protects their feet from the hot sand of the Kalahari and prevents them from sinking too deeply into the loose ground. Such sandals are part of the regular hunting outfit of those tribes whose members are able to pursue game by foot, chasing it incessantly for days without allowing the animal to rest or feed, until it breaks down from exhaustion.

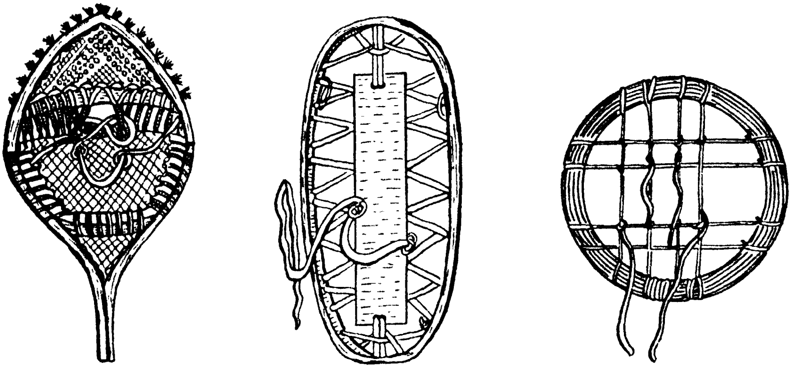


SKIS
COVERED WITH
REINDEER SKIN
East Yaks
Museum of Ethnology, Hamburg
(*after A. Byhan*)

While the sandal improves the safety of the human foot on the bare soil, creepers or skates make it possible to ' run ' on the surface of the ice. Since palæolithic times Asia and Europe knew skates manufactured from bones. The Edda, that ancient literary document of Nordic Europe, mentions the ' ice bone,' from which, during the thirteenth century, Holland developed wooden skates with iron blades. The all-metal skates of our days were designed in 1850 in America. Not unlike the ancient bone skate is the Eskimo creeper, carved from walrus tusks, which is tied to the boots when the hunter approaches his prey on the ice.

To glide on the snow rather than on the ice is the purpose of skis, whose prototypes were the ' sliding woods ' of the Bronze Age. In the far north of Europe and Asia skis were developed into forms not unlike our present-day models, with the foot of the wearer resting on birch-bark platforms and the lower sides of the gliders covered with the skin of reindeer or seal. They are used with the additional aid of a pair of ski poles with bone points and small laced hoops at the ends. The skis of the Lapps are longer and broader than these early models, without fur coverings and in appearance much more like our modern skis—whose development as sporting rather than hunting gadgets originated in the Norwegian hills of Telemark. The ski is not among the cultural possessions of the American primitives.

SNOW-SHOES



Montagnais-Naskapi Indians, Labrador
Collection Julius E. Lips

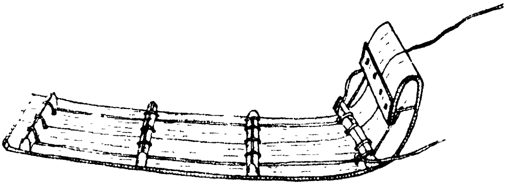
European Alps
After G. Montandon

Eskimo of Baffinland
After F. Boas

While the ski emphasizes the idea of speed, another arctic invention, the snow-shoe, is dedicated to the purpose of walking safely over the deep snow. This foot-gear is of the greatest importance in all arctic regions of the world. Originating in Asia, the 'snow-shoe culture' reached America even before the Eskimos spread out over the northern sector of the continent, and its dissemination reaches as far as northern California. With it travelled the moccasin, that foot-gear of soft leather on which the foot of the hunter is anchored to the centre of the snow-shoe by lacings of leather strings. The arctic regions of the American continent have indeed become the classical centre of the snow-shoe; the much cruder European models do not measure up to intricate American varieties.

Among the hunters of the interior of Labrador the Naskapi are among the best-skilled craftsmen of snow-shoe manufacture. The wooden parts are carved by the men, but the lacing is women's work. It is fascinating to watch the manufacture of a pair of *asham*.

For the frame, a stick of birchwood is softened in hot water and then bent over the knee into an arch. To force it into the right shape the two lower ends that later form the 'tail' are firmly tied together with leather strings, while the centre is held open by a strut. The average length of a Naskapi snow-shoe is about three feet, the width at the broadest part about two feet. When the frame is dry enough cross-studs are attached to the frame, and rows of holes are punched into it with the bone drill. The lacing of moistened caribou-leather strings is run through the holes by the women in a regular pattern of firm interwoven meshes, with an exactness and care that result in finished products of perfection.



TOBOGGAN
Montagnais-Naskapi Indians, Labrador
Collection Julius E. Lips

Finally bands are attached to the centre in a series of intricate loops that hold the moccasin-clad foot of the wearer firmly in place.

The hunter, thus equipped with snow-shoes, invented ages ago the oldest device with which to haul his weapons, his provisions, and his prey over snow and ice : the sledge. Its earliest use was probably preceded by dragging things on animal skins. Dragging home killed bear, moose, elk, or reindeer probably suggested the utilization of their skins for similar purposes of transport. But soon flat pieces of wood replaced this crude method, and the sledge was born. Neolithic findings, especially, prove its venerable age. In the arctic regions of Asia and Europe, particularly in Finland and in the regions where the Lapp hunters roam, we find its oldest form, either simply a piece of flat wood or a simple construction of several boards. The toboggan of northern Canada touches the ground with its entire flat bottom. To the Naskapi it is the indispensable winter vehicle for hauling burdens of all types over the snow : small children, bagged game, firewood, and the bodies of the departed on their way to the grave. The building material is birchwood split into boards of about fifteen feet in length and twelve to fifteen inches wide. The two principal boards for the base are held together by four cross-pieces ; the upward-bent front part is shaped with the aid of hot water, and supported by a fifth cross-piece. Holes are drilled, and all parts are held in place by firm lacings with caribou-leather strings. When the Indians leave for the summer places in their canoes they store their toboggans in the tops of the trees on their hunting grounds.

Of a more complex form are the sledges equipped with runners used by the Eskimos and by some neighbouring Indian tribes, by the Samoyeds, the Gilyaks, and other peoples of arctic Asia. It may be assumed that the runner-type sledge, especially of the Eskimos, is a comparatively recent invention. Nordenskiöld traced its origin to the Old World. The original type of Eskimo sledge is probably the runnerless model still used by the Caribou Eskimos. Among the Scandinavian peoples of Europe the so-called ' summer ' sledges transport timber over the sleek ground surfaces of their coniferous woods—a method which was customary in Egypt for the hauling of heavy loads over sand and other smooth surfaces.

A fully loaded sled or sledge constitutes a weight which can hardly be moved by the power of one man alone. It seems that since the dawn of time man had learnt to ease his burden by making use of the pulling power of his oldest domesticated animal companion, the dog. Dog teams pulled the sledges of prehistoric man as they pull the toboggans and other sledges in the arctic wildernesses of to-day. The dog's oldest pack companion was the reindeer, employed together with the elk in northern Europe and Asia as a beast of burden even in modern times. Reindeer were used for hauling before they were domesticated as dairy animals and mounts.

This holds true also for the members of the cattle family, the yak of Tibet being the oldest domesticated species. The water-buffaloes of China were domesticated later. Yokes for cows or steers have been found in the habitations of the European Lake Dwellers, those early lovers of comfort.

The horse, known in Europe in its wild form during the Palæolithicum, was used for the moving of burdens since the Neolithic period. Harnesses for horses have been found in the remnants of the ' band-ceramic ' period. During the third millennium B.C. the horse came from Asia over Asia Minor to Babylon, to reach Egypt towards the end of the Middle Empire. The North Africans, those master raisers of thoroughbreds, began their famed tradition in 2000 B.C. In America the horse was unknown in pre-Columbian times.

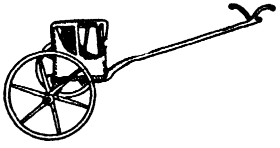
In South America, long before the arrival of Columbus, the llama and the alpaca were the animal helpers of man as they still are. The range of Asiatic pack animals is wide indeed : dog, yak, horse, reindeer, camel, dromedary, zebu, elephant, ass, and even sheep pulled the vehicles of man from the dawn of time to our days. Not all peoples on earth, however, have learnt to make use of animal power for the purpose of moving their loads and burdens. Australia, the South Sea Islands, Japan, and entire Negroid Africa originally knew no beasts of burden.

The habit of riding animals is of a more recent date than their use for packing. However, ancient figures from the middle of the third millennium B.C. found at Kûl-Tepe show human beings riding on the backs of animals, and the 'horse-riding culture' of Asia is an exceedingly ancient one. In later times the North American Indians of the plains, and South American tribes like those of the Chaco, who rode their horses on straw-padded leather saddles with bone splinters for spurs, took to the horse so completely that they practically lived on horseback.

Among the tribes of the prairie, the horse replaced the dog which, in olden times, had pulled the travois, a structure of two poles on which a burden was tied, and which dragged on the ground behind the animal. The travois constitutes a very ancient method of moving bundles, tents, children, timber, and the like. Its Asiatic form, still in use by the Kirghiz, is pulled by a camel, which in addition to its burden also carries a rider.

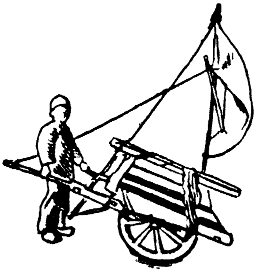
It is a far cry from the bumping, bulky travois to smoother means of transportation ; and real comfort and speed could only be attained by that supreme invention in the field of transportation, the wheel, which is a creation of the high cultures and unknown to primitive man. By reducing the size of the surface that touches the ground and by the first application of a moving circular support, the friction caused by the weight of the load could, by means of the wheel, be so minimized that big loads were transported with comparatively small effort. Heavy objects, formerly 'immobile,' could now be moved by the power of man or by the power of the animals he trained for this purpose.

The first archæological evidences of the wheel date back to the Mesopotamian city cultures. It is assumed that the idea of rolling along a heavy object originated in the practice of sliding logs under the weight to be moved—a technique the Egyptians applied when they moved the cut-stone squares used in the construction of the pyramids. The oldest wheels consisted merely of solid discs of wood, firmly joined to an axis that moved with the wheels. Later modifications resulted in the invention of the nave, or hub, and the hollowing of spaces in the centre. Gradually the intersections between the carvings became thinner and thinner, leading during the Bronze Age to the development of the spokes. Spoked wheels were known in Asia Minor as early as 2700 B.C.



EGYPTIAN CHARIOT
1400 B.C.
The Gizeh Museum of Egyptian Antiquities, Cairo

While the cart for moving loads was a general means of transportation, the two-wheeled chariot was first depicted as a vehicle reserved only for the gods. When mortals began to appreciate its comforts it was reserved for the rulers, who later shared it with the wealthy. In classical times it was the beloved vehicle of noble sports. The mythical significance of the wheel as a symbol of the sun, of the deity, and of good luck has made it a preferred ornament; and the habit of celebrating the solstice by rolling burning wheels downhill or by throwing wooden discs into the air is a reminder of the manifold interpretations to which the wheel was connected with the supernatural.



CHINESE WHEELBARROW WITH SAIL
After M. Haberlandt

The two-wheeled cart is older than the four-wheeled vehicle, while the one-wheeled push-cart or wheelbarrow, in China often equipped with a sail, is among the oldest of vehicles. In the Chinese South a one-wheeled litter facilitates the work of the carriers who merely steer and push it. In northern China the so-called ' great wagon ' is used for long trips, with a tent-like structure mounted on two wheels. It reminds one of the famous covered wagon of the American pioneers.

In the wars of centuries ago the possession of wheeled vehicles was a decisive factor of strategy. To all students of classical literature the barricades formed by chariots and the wheeled Roman catapults and onagers are familiar conceptions that played important rôles in ancient history.

China is the place of origin of so many great and also quaint inventions that to many white travellers the Chinese ricksha is a ' typically Oriental ' means of transportation. But to the Chinese it is *yang ch'e*, ' the foreign cart.' It is a modern American invention, just one hundred years old. The Baptist missionary, Jonathan

Goble, who lived in Yokohama, devised it with the help of a Japanese carpenter when doctor's orders prescribed 'gentle outdoor exercise' for the missionary's ailing wife. A shrewd Frenchman who saw the vehicle realized its possibilities and introduced it to China in 1847, where it appealed so greatly to the old users of the litter and the sedan chair that it became the nucleus of a whole industry. To-day the cities of China are enlivened by about four hundred thousand rickshas that steer precariously among modern automobiles. However they are doomed, and will soon become a romantic thing of the past, because the government has come to the conclusion that the trade of ricksha-pulling 'debases a man,' although this decree does not apply to the litters and sedan chairs sanctioned by tradition.

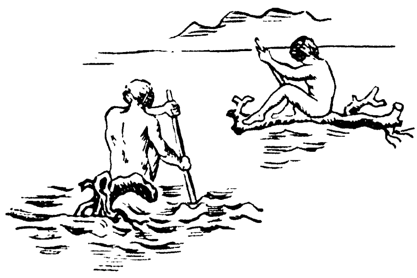
The development of the classical chariots and wagons into more comfortable vehicles, from the 'surrey with the fringe on top' to the modern automobile, was as rapid as most of the nineteenth- and twentieth-century technical changes. When we consider the thousands of years that the wheel has been in use and compare it with the history of the motor-driven car, which began at the end of the last century, we may well wonder what future type of vehicles will make use of the wheel.

While paths cleared the jungle for the travels of man, and bridges spanned the abyss and the river, human ingenuity did not stop at the waterways. Wherever the waterways of nature indicated a direction desirable to follow, man floated on them in his boats.

The simple trunk floating down a river furnished the oldest means of travelling on water. The primitive method can still be observed along the waterways in the interior of New Guinea. When the vessel of the explorer, Fintsch, approached the island the natives paddled round his ship, riding trunks and even the roots of trees in a most skilful fashion. From the floating pieces of lumber, then, the dug-out or monoxylon gradually developed. Its world-wide distribution makes it a universal type of early transportation on the waterways.

From Australia to the Pacific Islands, from the Sudan to the arctic regions of Asia and Europe, the dug-out (whose hollow part is often *burnt* out) is known to many primitive travellers of the world. It was the only boat of the South American nomads before Columbus ; they ventured out to sea in their monoxylas, which were often as long as sixty feet. The Guató and the Payaguá of the Chako stake their dug-outs along the banks of rivers with long, lancet-shaped oars, different in form from the short crook-handled paddles of the tropical forest regions. The piragua of the upper Xingú features a wooden plank or board.

In North America the Indians of the south-east coast of Alaska distinguish their dug-outs by finer workmanship and decorate them with fancy carvings. Krieger, who stresses " the fondness of the coast Indians for working in wood," which " becomes almost an obsession with them," describes their long dug-out canoes (which are hollowed from a single cedar trunk) as " constructed with a high ornamental prow and stern, shaped from separate slabs of cedar wood. Each has carved representations of mythical and realistic animal forms as totemistic and ornamental embellishments. Some of these boats were formerly fitted with sails of cedar-bark matting and are from forty to sixty feet in length. They have no rudder, but are steered with a stern paddle. Natives of Sitka, on Baranoff Island, are known to have sailed as far as Port Simpson on the Skeena, more than three hundred miles distant." These boats have a capacity of fifty passengers.



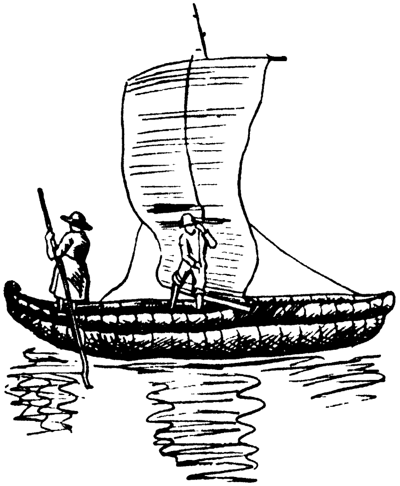
ROOT RAFTS
New Guinea
After K. Weule

Some African dug-outs, especially of the Cameroons, are also richly decorated with carved ornaments, while those of the Sudan are more crude. The East African fishermen of Lake Tanganyika have their individual dug-outs. If the chosen tree is too tall it is chopped off ; if too short, its submerged trunk is dug from the soil. When roots, branches, and bark are removed the trunk is hollowed out with an axe and with the help of the *iesso*, the common tool. Two thick, square boards are left in the trunk to serve as a foot-rest. The White Fathers who furnish this description remark that often crooked trees are worked into canoes and that some of the dug-outs look as if " they could not go straight," although they do, of course. They may serve for eight years or longer, and are trimmed with good-luck charms. A ceremony of magic inaugurates the use of a

DUG-OUT CANOE

new dug-out. It includes an appeal to the ancestors and a series of hearty epithets directed against all who should threaten the new boat by their evil intentions, be they human beings or ghosts.

The dug-outs of northern Eurasia are probably an importation and not a legacy of prehistoric times. The swamps of Finland and northern Russia, otherwise so rich in cultural remnants of the oldest periods, have not yielded a single specimen. In Estonia the dug-out is still built by the village population and known as *Läänemaa*. Middendorf observed them on the lower currents of the Siberian rivers which empty into the Arctic Sea, and noted that they were manufactured " south of the Polar Circle from whence they are transported to the peoples of the North Lands."



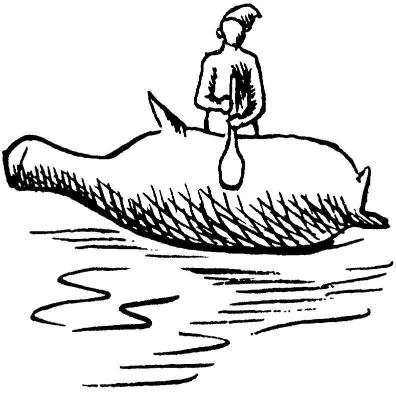
BALSA BOAT
Lake Titicaca, Bolivia

Perhaps of the same age as or even older than the dug-outs are the roughly constructed bark boats. The Fuegian Yamana and their neighbours (except the Selk'nam) build them from three pieces of bark, crudely sewn together with whale barbels. They are always navigated by a woman, who holds a simple paddle in both hands while her husband hovers at the bow, holding his harpoon or spear in readiness. The children are kept busy not only taking care of the fire which burns in the middle of the boat, but with the continuous bailing of water.

Some African tribes who build equally fragile bark boats, like the Negroes of Central and Eastern Sudan, use another type of ancient watercraft, the raft. These rafts are bundles of papyrus shafts tied together, or piles of ambash (*Herminiera elaphroxylon*) wood ; both types are familiar sights in the Upper Nile region. Their South American equivalent is the balsa of Lake Titicaca. In India rafts appear along the Coromandel coast, and they are a favourite means of water transportation of the Californian tribes of North America. The Kamia build them fifteen feet long, composed of twelve to fourteen bundles of tule, and capable of carrying seven persons. The Tubatulabal tule rafts are only about half that length, square on both ends, and without sides. They require two men when used for spearing fish.

A curious variety of the raft is the *corita* or pitch-cemented woven basket of the Lower Colorado which serves as a ferry. Equally strange is the huge, round clay vessel of the natives of Assam which carries its passengers safely over short distances.

Another very ancient method of water transportation employs sewn animal skins, either filled with air or fitted over a structure of bone or wood. Inflated animal skins floated along the rivers of Mesopotamia, Nubia, India, and Babylon. The bull-boat of the Prairie Indians was a round vessel of buffalo hide, stretched over a frame of elastic wood. It had the appearance of an open, turned-over umbrella. The South American *pelota* of steer hide is a comparatively recent importation, introduced by the Gauchos among the Abipones and in the Pampas.



RAFT OF INFLATED ANIMAL SKIN
Northern India
After K. Weule

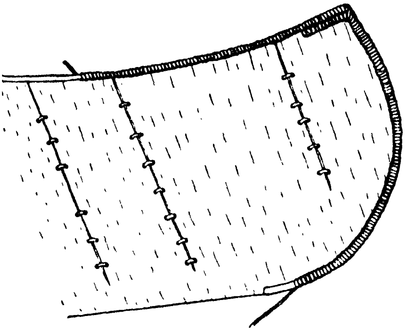
The huge skin boat of northern Asia, with its sails woven from entrails and its floaters of seal hides, was, with variations, in wide use throughout prehistoric Europe. It has its late counterparts in the skin-covered vessels of the Lapps. The skin boats of the Eskimos and other present-day arctic peoples are the kayaks and umiaks. A kayak is usually occupied by a single hunter, although the natives of southern Alaska and of the Aleutian Islands devise two- or three-seated models. A frame of driftwood holds the structure together. This is covered over with sewn sealskins, with only one narrow, round opening for the occupant, who is protected from water by clothing made of skins. A fixed tray and some bands to hold his harpoon and harpoon-line in place, besides a paddle of one or two blades, are about the only equipment the hunter can take along in this extremely light and navigable craft. The umiak is an open boat, also consisting of a large wooden frame and covered with skin. It is younger than the kayak, and probably originated in north-eastern Asia. In Greenland the umiak is merely used for transport, not for the hunt, and is known as the ' women's boat.'

A very efficient water-craft is the birch-bark canoe of the subarctic hunters and related tribes (not to be confused with the rattling bark vessels of the Fuegians, to which it is far superior). The Indians tailor it from one piece of the bark of the Canadian canoe or ' paper ' birch (*Betula papyrifera*). ' Tailored ' is an appropriate description, because only a very skilful and experienced cutter is able to fashion such a craft without the aid of metal tools or the white man's iron nails.

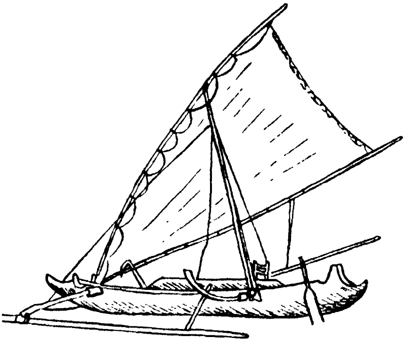
After a suitable tree has been chosen two deep circular incisions near its crown and roots are made with the beaver-tooth axe, followed by a straight vertical cut and the careful peeling off of the bark. While the man is busy with this work his wife collects long strands of spruce root from the ground. After removing the black bark she splits the white roots into long, flexible strips which are boiled and left in water in order to retain the flexibility necessary for their use as ' sewing thread.' As soon as all materials have been assembled the canoe builder prepares the ' bed,' or building place, of the canoe. The ground on this spot must be firm, solid, yet slightly sandy. The bark, its weather side facing the soil, is laid on this ' bed,' then is bent upward over a bottom frame of cedarwood. Another frame of two long, curved sticks encloses the bark from the outside.

As soon as the inner frame has been firmly set a load of heavy stones is heaped inside to stretch and weigh down the bark. The overlapping parts are cut away, and the ' tailoring ' is finished. The next phase of the work, the sewing together of the tailored parts, is women's work. Holes are drilled with caribou bones at regularly spaced intervals in the bark, and are run through with stitches of spruce root. When all parts are thus sewn together with neat, identical stitches the gunwale is built into the body of the canoe, which is still, at this point, filled with stones. The shape of the vessel is now secured, and the stones may be safely removed. The next step is gluing the seams with a mixture of boiled spruce resin. The women now withdraw. The men take over again, and fit the entire inner body of the canoe with ingeniously cut ribs of cedarwood, both crosswise and lengthwise, which give the canoe its final and typical shape of a round-bottomed, smartly symmetrical boat.

This canoe, together with the toboggan, is about the most important possession of any Indian family. Many families possess three or more of them to move from the big lakes of the summer camps to the wilderness of the hunting grounds where the all-important furs are sought. The canoe carries them back in the spring on the narrow streams, the 'streets' of the wild woods of the interior of Labrador.

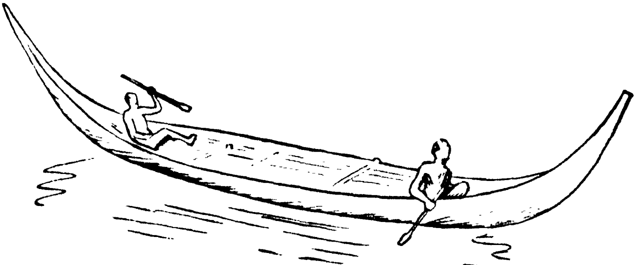


BOW OF 'TAILORED' BIRCH-BARK CANOE
Montagnais-Naskapi Indians
Labrador
Collection Julius E. Lips



OUTRIGGER CANOE WITH SAIL
Madura Strait, Indonesia
After Pritchett

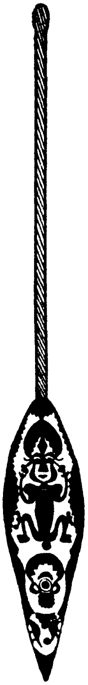
Only one who has seen the artistry, the care, and perfect workmanship applied in the manufacture of these vessels can imagine the beauty of such a boat. The slowly paddled birch-bark canoes on the immense lakes of Canada are a proud sight.



'MON' BOAT WITHOUT OUTRIGGER
Solomon Islands
After Hambruch

About the most famous vessels built by primitive man are the canoes of the South Seas with their special feature, the single or double outrigger. They represent the highest technical achievement reached in primitive boat-building.

Although the *mon* canoes of the Solomon Islands are without outriggers, the characteristic models of the other islands generally possess the outrigger defined by Haddon as " a balancing apparatus that extends traversely across the hull of the canoe." In the great travelling boats of Polynesia the second outrigger is often replaced by a second canoe attached to the first—a form which had its origin in Indonesia. The smaller, ' second ' boats often carry completely furnished little huts in which coconuts, fishing tools, water in calabashes, and hearths with burning fires are kept for the comfort of the travellers. The larger boats are equipped with sails of mats woven from pandanus leaves—swallow-tailed in shape in South-east New Guinea and the Santa Cruz Islands, triangular in Micronesia and Polynesia, square or elliptic in Melanesia, the last type sometimes being attached to single or double masts. Large stones or stone-filled baskets serve as anchors ; rudders hang in a sling on the stern.



PADDLE
Solomon Islands
Museum of Ethnology, Cologne

The natives of these islands have developed a considerable skill at navigation, and have regular nautical maps which they use to determine the direction of their travels. Thoroughly familiar with the currents and tides and, especially, with the location of the stars, they steer safely through the sea. Regular navigation schools exist on the Caroline Islands of Mogemog, Uleai, Poluat, and on Jaluit and Arno of the Marshalls. The Polar Star marks the north, the Southern Cross the south, and the east-west direction is determined by a multitude of other known and named stars, as Hambruch has shown in his studies on South Sea navigation.

On land and sea primitive man has thus found ways to travel and to move about, making free use of all the facilities provided by nature. We consider ourselves masters of the roads and of the rivers and oceans when we board our twentieth-century giants of transportation, but we must also consider that, unlike the man in the wilderness who builds and directs his vehicles, we are not individually masters of the ability to transport ourselves and our possessions.

Only since the beginnings of the air age have the ancient roads of land and water lost their significance to any considerable degree. Flying through the skies, we have found the miraculous magic carpet about which the travellers of the jungle could only dream.

CHAPTER EIGHT

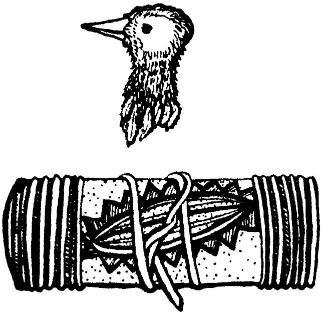
Wall Street in the Jungle

IN TIMES OF FINANCIAL CRISES, whether runaway inflation or deflation, we tend to lose faith in that magic medium known as money. At such times we harassed victims of civilization occasionally like to think about some remote, exotic island with its idyllic and simpler form of society as the ideal haven of economic security, unaware of the fact that the unsophisticated children of nature have worries not unlike our own. Fundamentally the difference between a dollar bill and, for instance, a cowrie shell is merely one of appearance. The man on Broadway who pays a bill by cheque is doing neither more nor less than an Indian of the Hupa tribe who fumbles in his leather pouch and produces the head

CONGO MONEY, LINED UP DURING TRADE NEGOTIATIONS

American Museum of Natural History, New York of a red woodpecker in payment. The shape of coins may be different all over the world, but the worries that go with them are the same.

The most widely distributed money of primitive peoples comes from snails and shells. The thick-edged porcelain shell of the cowrie snail has been used as a medium of exchange for centuries in the remote regions of the globe. The snails are caught by the simple device of throwing cocoa leaves into the water and collecting them after the mollusca have settled on them. Merchants of all nationalities deal in this primitive coin — a trade which extends to China, Japan, and the East Indies. Its main places of origin are the Maldivian Islands, south-west of India proper, and the East African island of Mafia. The thirteenth-century traveller, Marco Polo, noted the use of cowrie coins in the Chinese province of Toloman. " These were porcelain snails," he wrote, " such as were formerly used on dog collars."



RED WOODPECKER'S HEAD 'COIN' AND ELK-HORN 'PURSE'

Hupa Indians

Museum of Ethnology, *Berlin*

In time, the high cultures chose other mediums of exchange. China replaced its cowries with silver and copper ; Tibet with silver. In Africa, however, the use of the cowrie-shell money is still common, its value increasing with the distance of the tribal land from the coast. In the interior everything is paid for in cowrie. Even the white missionaries collect contributions in it. Among the Buboka, an axe costs one hundred and fifty cowries, a piece of Indian cotton has a value of six hundred cowries, and to buy two cakes of European soap or a package of dried grasshoppers you need one hundred cowries. The price of a bride among the Bassari is fifteen thousand cowrie shells plus one cow—an expensive luxury for any prospective bridegroom. A fetish, artistically modelled from clay, brings three hundred cowries, the equivalent of about five cents. Relics and grave-stones, taxes and fines, are all paid for in cowries, and one can become bankrupt in terms of cowrie as easily as in dollars or pounds.

COWRIE SHELLS

Another snail, *Dentalium edulis*, was used by the old Indians between Alaska and Puget Sound. It was dug by the women from the banks of the Vancouver River and valued on account of its brilliant white colour and its symmetrical shape, resembling a miniature elephant's tusk. The South Sea Islanders hardly ever deal in cowrie or dentalium. Not satisfied with mere shells produced by nature, they fashion the shells into 'money,' which, threaded on strings, is handled with all the respect due to the authorized product of their 'mints.'

By far the most prominent Melanesian currency is the famous *nassa* money, also known as *diwarra*, or *tambu*. It needs special craftsmanship for its preparation. Its manufacture is a privilege of chieftains ; no woman may take part in it. *Diwarra* is made from a half-inch sea snail with a camel's-hump-shaped shell, known to zoologists as *Nassa camelus*. The natives along the coast of Nakanai, where the shell is found, collect the precious snails with nets from the bottom of the sea and store them in their huts, regardless of the offensive odour caused by the decay of the animal matter.

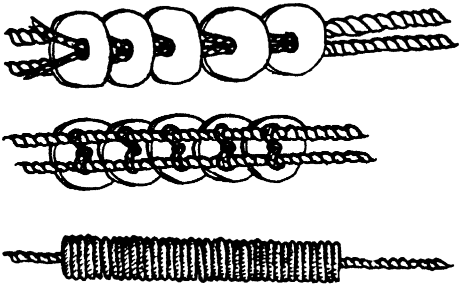
As soon as the south-western monsoon season is over many expeditions in outrigger boats set out from the Gazelle Peninsula, from the Bay of Talili, and from neighbouring islands, to catch the *palatambu*, as the natives call the unprepared shell. This entire enterprise is accompanied by ceremonial splendour, because *diwarra*, or *tambu*, is caught and prepared with religious devotion. The first wish welcoming a new-born boy is : " May you become a great and strong man, so that you may travel to Nakanai many times to get plenty of *tambu*." This trip takes about a month.

For all natives of this region *tambu* is their most cherished property, more valuable than life and health. *Tambu* is 'great and holy,' as its name indicates. Its possession even buys immortality, because only the wealthy after death go to Nakanai, the holy *tambu* land.

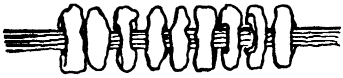
To cut the *tambu* out of the raw shell the natives press it into the hole of a coconut and cut off its 'camel's hump,' with the sharp edge of a shell tool. After the hole has been punched the shell is thoroughly cleaned. To give it the desired white appearance, it is submitted to an intricate bleaching process. Finally the *tambu* is strung, first on strips of bark to remove the last yellow hues discolouring some of the shells, and later on liana tendrils.

No one would dream of keeping more 'cash' in his hut than absolutely necessary. The rest of an individual's fortune is kept in the People's Bank or community *tambu* house, hidden in the bush and protected by constant watch. The money strings are tied together in rings often as large as a wagon wheel, wrapped in pandanus leaves, and bound all round with rotang cord. One such ring may contain five hundred fathoms of *diwarra*. It has the appearance of a heavy tyre.

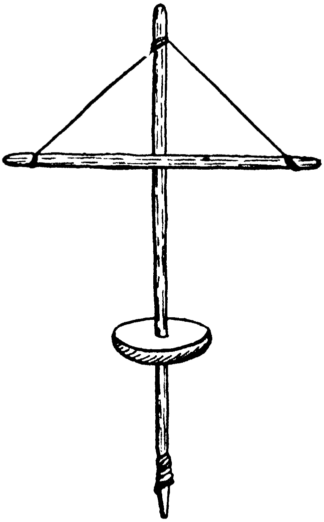
Not unlike the money-worshippers of the civilized world who love to count and re-count their bank balances, the natives sit in their huts, measuring their *tambu* strings and experiencing all the genuine joys of wealth before they entrust their fortune to the bank.



SHELL MONEY
'Bakiau' and 'Sapisapi'
South-east New Guinea



TAMBU (DIWARRA) SHELL MONEY
Gazelle Peninsula



DRILL FOR THE MANUFACTURE OF SHELL DISKS
New Guinea

After H. Petri

So important is the rôle *diwarra* plays among these islanders that there is hardly any function of their daily lives in which it is not needed. Everything can be bought or sold in *diwarra*—even children, whose price is about equal to that of a bride : ten to fifty strings. Wives are constantly urged to work to enable their husbands to cash in as much *diwarra* as possible, thereby increasing the husband's power and influence.

In times of war the precious *tambu* strings are buried. The great tycoon who owns the largest amount of money strings is called a *luluai* or *patuan*, meaning ' chieftain ' or ' big boss.' Those who have but little *tambu* are *luweans*, or ' poor devils.'

Even immaterial values can be measured in *diwarra*. There is no wrong which cannot be repaired by a *diwarra* payment. For adultery, three to five strings are sufficient ; murder requires about fifty strings ; theft, twenty. Even the greatest, almost irreparable crime—the theft of *diwarra*—can be atoned for with a set payment. Secret societies occasionally misuse the religious conceptions of the natives for the sake of the beloved *diwarra*, mulcting some naïve soul of it under the guise of mystical representations. In time of war the chieftain who wishes to engage the service of allies has to pay generously in *diwarra*. This emphasis on money is unequalled in the civilized world.

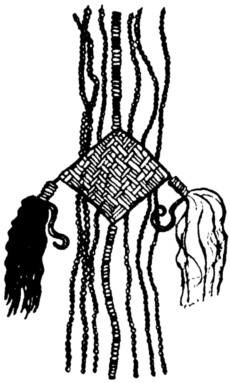
Another type of shell money is obtained by making thousands of individual shell disks which are tied together and strung, often to a length of many yards. The Indians of California used this kind of money to purchase brides or to pay for adoptions, funerals, games, and even peace agreements. Like the South Sea Islanders, the Indians measure all such strings by measurements of the human body, from finger-tip to elbow, from papilla to papilla, from shoulder to shoulder, etc. The American wampum was made of disks from white and purple quahaug shells. Woven into belts, it also served as a legal document for the conclusion of treaties.

In contrast to the ' holy ' *diwarra* money, shell disks are manufactured mainly by women. Not the material, but the artificially ' coined ' shape give these disks their monetary value. Famous ' mints ' are located on the Solomon Islands, on islands of the Bougainville Straits, on the Banks Islands, and elsewhere. Many tribes of the Gazelle Peninsula, where such strings are termed *pele*, trade them for *nassa* shells. Along the Buin Coast of Bougainville ten to twenty fathoms of shell-disk money buy, according to Thurdwald, a pig or a widow ; murder costs one hundred to one hundred and twenty fathoms ; and a young girl may have a value of up to a hundred and fifty fathoms.

The disks may be white, black, purple, or red, the latter especially on Ponape. Great shells are broken into smaller sections which are pressed into a wooden board and polished with a stone on both sides. After their perforation with a primitive drill the disks are strung on hibiscus fibres, and their rims are carefully filed down with pumice stone to make them of standard circumferences.

On Truk and Mortlock the tiny disks are occasionally fashioned from fruit shells. The Mariana Islanders make money strings of thin tortoise-shell disks.

That shell-disk money belongs to the oldest mediums of exchange is evidenced by findings in prehistoric graves in which whole 'fortunes,' buried with the deceased, have been discovered.



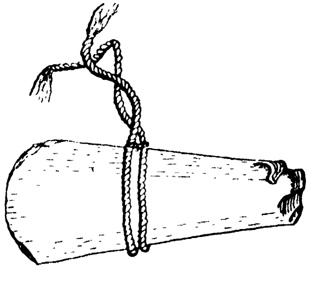
SECTION OF 'PIG-MONEY' STRING

New Ireland

Museum of Ethnology, Cologne

A combination of shell disks and other objects regarded as valuable by the natives is the so-called 'pig-money,' frequently used on New Ireland. It consists of up to twenty thousand individual disks, strung together with glass beads, woven intermediate pieces of rotang strips, and dog teeth. Its lower end is always decorated with one or more pigtails. This money is used for the purchase of pigs and of women, but for the latter, two strings of dog teeth have to be added.

One such piece of nearly thirteen yards' length consisted, according to Petri, of a long string of black and white shell disks with larger fruit-shell disks at regular intervals. This was followed by a woven square of orange and black dyed rotang strips, its corners trimmed with shell disks and pigtails. The rest of the money string was made up of a long section of white shell disks, two parallel strings of shell disks horizontally arranged, another string of white and orange shell disks with coconut pearls, four dog fangs, a further long string of white disks, and eight white shell strings in parallel rows. A mother-of-pearl shell and three pigtails dangled from its lower end.



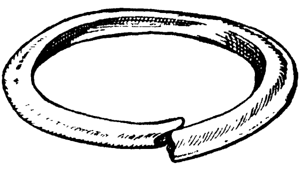
MOTHER-OF-PEARL MONEY JAR

Island Yap

After K. Weule

Other varieties of shell money are the valuable arm rings, fashioned in Micronesia mainly from the *Conus millepunctatus* shell and in Melanesia from *Tridacna gigas*. Petri describes their purchasing value as twenty *tridacna* rings for a hut or a canoe. The natives of Tumleo buy a quantity of sago or a large yellow bird of paradise with one ring; two such rings pay for a watch-dog, ten for a pig. The most valuable specimens are the yellow-spotted shell rings. They are cut from the large shells with a saw-like tool which consists of a wooden bow strung with a piece of bast. On the western and central Caroline Islands, especially on Ponape, these rings are fashioned from the conus shell. Similar pieces were used in prehistoric times.

Mother-of-pearl shells are another widespread 'coin,' especially in the Caroline Islands, where they are known by the name of *jar.* They are cut in the shape of a spade, punched, and tied to a cocoa string. On the island of Yap only women are allowed to use *jar* as currency. Consequently the natives term it 'women's money.' The men of Yap deal in a completely different 'coin' which belongs to another type of currency—stone money.

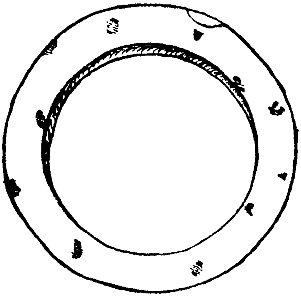


BOAR'S FANG MONEY

New Guinea

After K. Weule

The famous coins of Yap, called *fei*, are gigantic wheels of aragonite, a sort of limestone found on the islands of Pelew. To collect these stones the men of Yap have to make a trip of several hundred miles. Just as in the case of the *diwarra*, this type of currency does not serve as money in the territory where it is found, but is used by tribes living far away. With great difficulty the aragonite is cut from the rock without the help of any metal tools, and transported to Yap on rafts towed by canoes.



MONEY RING OF THE YELLOW-SPOTTED TRIDACNA GIGAS SHELL

Solomon Islands

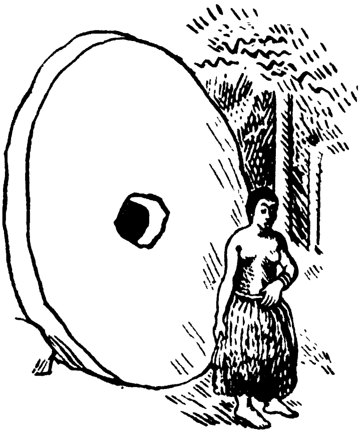
After H. Petri

This money is of enormous size, round and flat, with a drilled hole in the middle, somewhat like a millstone only much thinner. Its value increases in proportion to its size and its thinness. *Fei* may be up to five yards in diameter, and probably constitutes the largest coin in the world. Its value is measured by the spread of the hand. In the year 1900 a *fei* measuring three spans in diameter bought a bag of copra or about ten dollars' worth of merchandise. A large-sized *fei* is worth a woman, a canoe, a pig, and a great variety and quantity of fruit.

Naturally, the unusual size of this currency causes considerable difficulties in everyday trading. For this reason the *fei* money is lined up in front of a man's home. Selling goods to another man living far away, the merchant merely inspects the appearance and position of his customer's *fei*. He does not take actual possession of each stone wheel, and may own *feis* spread all over the island.

When a native of Yap has to pay taxes or fines the white administrators simply mark some of his *feis* with the initials of the district officer. If the coin happens to change hands again the initials are erased. Neolithic findings in China and Indo-China show that this currency is also of very ancient origin.

Marble rings are used as money on the island of Isabel and on the New Hebrides. Native head-hunters value them as the equivalent of one human head, a 'very good' pig, or a medium-sized young man. In the southern regions of New Guinea the blades of ceremonial hatchets fashioned from volcanic stone are a recognized currency. From the 'mint' on Murua they are traded westward to the Papua Gulf. Pigs, food, canoes, and land are paid for with this money, and they are the witch doctor's fee for successful 'magical' services.


'FEI' MONEY STONE
Island Yap

The most valuable stone currency in white men's eyes is, of course, such 'coins' as consist of precious or semi-precious stones. On account of their scarcity, such stones pass more often as valuables than as everyday currency, although they are used as money in many places. In ancient China the jadeite was used as a coin. To-day the natives of Borneo use agate as money. So do the natives of Uchichi, who add jasper to their currency. The Caribbeans bought slaves with nephrite; and in Kordofan, Darfur, and India pearls even to-day are legal coins.

In 1624 the explorer Braun spoke of 'mystical *aggri* pearls' which he encountered in the highlands of 'Ambosy' (Cameroons). The natives called them *abug*, and would sell even human beings for two or three handfuls of them. According to a native legend, these *aggri* pearls were mined in the land of Bonyæ, but the mine shaft caved in. This explains their great value. Only the chieftains and their wives were allowed to possess *aggri* money.

Glass beads have been carried all over the globe by explorers and traders to buy native goods. In some places these beads are so firmly established as coinage that price fluctuations take place according to fashion trends and changes of taste. Behold the

South American Indian who invested his whole fortune in old-fashioned blue beads instead of in the modern red ones! His former fortune is just as worthless as some stock shares were during the depression of the 1930's.

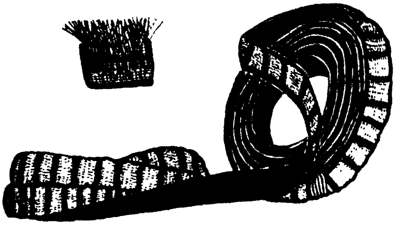
In Africa the use of beads for money is so widespread and so subject to changing trends that numerous attempts have been made to 'stabilize' certain varieties. Yet these attempts have encountered unsurpassable difficulties, in view of the continuous imports of tempting novelties. King Soona of Uganda attempted to emancipate himself from European imports by planting beads in the hope of getting a large crop, but sadly enough his attempts came to naught. Along the Croo coast glass-bead money is in circulation which, according to the natives, was mined by their ancestors in the bush and which they thought 'grew' in the soil.

On the Pelews the islanders cherish a 'holy' earth and mineral money called *audouth.* Since it is very scarce they hoard it carefully. Sixty years ago its best specimens were valued by white traders at about four thousand dollars a piece, which explains the fact that these coins are never in circulation and are seldom shown to anybody. Petri states that this money has executed "a decisive influence upon the entire tribal life" of the natives.

A more important medium of exchange is the tooth coin. It usually consists of rare animal teeth. Many of these coins are teeth artificially retarded in their growth. The tusk of the wild boar is a strange coin of this type. To attain its highest value, it must be grown in a ring-like shape. To produce this 'ideal' form, the upper tusks of young boars are pulled out. This causes the lower ones to grow with their points turning downward, and within a few years the desired circle is attained. This money is especially appreciated by the Papua, who wear the rings on their arms.

Much wider is the area of distribution of dog-tooth money, which is found not only on New Guinea, but also in the Bismarck Archipelago and on the Solomons. Only the four fangs of a dog are used for money. Arranged in three parallel strings, dog fangs pay for a pig, for food, and for pottery. A woman or a young man has a value of a hundred dog teeth. On New Guinea this money is an important means of intertribal commerce. Schmidt reports that the Nor-Papuans manufacture bracelets which they exchange for tobacco at Dallmann Harbour. They then trade these goods in Kis for dog teeth. In Vatam they buy with them the valuable red earth, which they exchange in Vaskulin for sago and pouches. These goods, in turn, are exchanged for pottery, and finally for large dog-tooth chains.

Kangaroo and opossum teeth are other ‘coins’ of the New Guineans, while North Bougainville and other places favour *reki*, or bat teeth, and *baiu*, the teeth of the dolphin. Dolphin teeth are also in circulation at San Cristobal and at Malanta. The Banks Islanders prefer boar money, and the Fiji and Gilbert tribes manufacture coins from the teeth of the sperm whale. A good example of the relative value of tooth money has been reported by a European explorer to whom the African tribe of the Hausa offered a ton of ivory for some cotton cloth worth less than fifty cents.



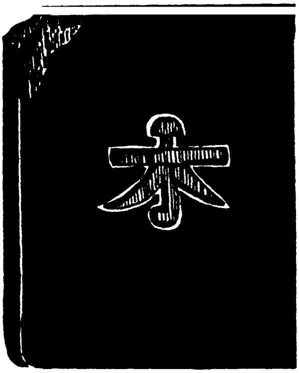
ROLL OF FEATHER MONEY
(*Above*) SINGLE FEATHER COIN
Santa Cruz
Museum of Ethnology, *Cologne*

‘Zoological’ money is, however, by no means limited to tooth money. Feather money is extensively used. The natives of Santa Cruz use small pieces of it, consisting of a woven band, as ‘small change.’ Substantial wealth is expressed by the possession of large rolls of feathers arranged in shingle-like fashion. Such a roll may contain two thousand individual feather ‘shingles.’ Its value is, according to Speiser, that of two big pigs or a girl.

FEATHER-MONEY NECKLACE
Banks Islands
Museum of Ethnology, *Cologne*

The rolls are carefully kept in *tapa* wrappings, hung up over the fireplace to protect them against insects, and are proudly displayed to any visitor. Handed down through generations, these rolls lose their value when the red feathers they contain are worn out. Wealthy people erect their own ‘bank vaults’ in the bush for the safe-keeping of their treasures, and occasionally the fortune of the tribe is displayed publicly on bamboo posts. Hundreds of birds must be killed to furnish enough feathers for these rolls, hence their high value. Pigeons and humming-birds contribute their feathers to this money, as well as chickens, but in the latter case only the fine feathers that grow round their eyes are chosen. The fabrication of this money is women’s work. On the Banks Islands small red feathers are tied together in bundles or woven into necklaces ; sometimes white feathers are added to set off the red ones more effectively. On Santa Cruz this money is occasionally woven into belts.

In Polynesia feather money and feather jewellery have reached their greatest perfection. Cook found, in 1777, that yellow and red parrot feathers were valuable coins. Images of the gods are trimmed with feathers by these islanders, and their famous chieftains' coats, containing thousands of artfully interwoven feathers, are among the most treasured possessions of many a white man's museum.



BRICK-TEA MONEY STAMPED WITH THE SIGN 'MU'

Central Asia

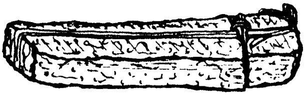
After K. Weule

On the Willaumez and French Islands the feathers and thigh-bones of the cassowary are used as money. The high esteem for this type of currency is due to the fact that the cassowary does not live on these islands.

North Assam knows 'skull money' derived from butchered cows, and the head-hunters of Borneo used human skulls as a medium of wealth.

Among the strangest yet most widely distributed moneys on earth is the edible 'coin.' Of course the tribes who use it make sure that such coins consist of products which are practically imperishable.

Salt is a recognized currency in most parts of Africa, often in the form of loaves or bricks of stone salt. To it the Pangwe add *kank*, a roll of boiled cassava mush. No health department stops the natives of Nias from circulating dried pork as currency. In ancient Mexico the smallest currency consisted of cocoa beans, which even to-day circulate as money in remote places. Brick tea 'money' enjoys an unusually extensive circulation in many Chinese provinces. It is made of tea-leaves, pressed into loaves the size of a brick.



STONE-SALT MONEY

Abyssinia

After K. Weule

Units of rice are often used as small coin, especially on Sumatra and by the Igorot. Salaries and taxes even to-day are paid in rice in many Asiatic regions. In the East Indies tapioca coins were known. On the Nicobar Islands pairs of small nuts are currency; Tibet prefers walnuts. Other vegetal currencies are dried banana peels and pieces of curcuma root, found on the Caroline Islands. Lapland uses even nowadays its ancient cheese money.

Stimulants also are used as currency. Nias and Eastern Siberian natives use tobacco leaves in this way. In West Africa white merchants pay with trade tobacco, one tobacco leaf being the smallest 'change.' Albert Schweitzer reports from Lambarene that one tobacco leaf pays for two pineapples and that all smaller services are paid for in tobacco leaves. Seven of them make a 'head of tobacco,' worth seven French francs. Some of Schweitzer's instructions to travellers in Africa are:

> If you want to buy food, don't take money along, but tobacco. If you want to avoid robberies, sit down on the precious box during the boat trips. On the water, the pipe goes from mouth to mouth. If you want to travel comfortably, promise each hand on deck two leaves of tobacco, and you will reach your destination one or two hours earlier than anybody else who offers white man's money.

More dangerous is a currency circulating in a Chinese province of Hainan—opium. Equally dangerous is the use of brandy money along the Loango coast, where it is passed in glasses or bottles as small or larger payment. During the rainy season an egg costs half a glass of rum, while the price is raised to a full glass during the dry season. A goat costs three bottles of rum and a piece of cotton cloth. The Ainu tribesmen pay with rice brandy which they receive from Japan. This alcoholic money is very dangerous, as it is likely to tempt its owner to become intoxicated with his wealth in the truest sense of the word.

With the development of the rubber trade many primitive tribes acknowledged rubber balls as means of exchange. In Togo they occasionally replaced even the traditional cowrie coins.

Closest to the white man's conception of money are the metal currencies which are used in addition to the other varieties, particularly in Africa. Especially in places where different cultures came into contact with each other, a variety of currency has been the rule. These metal moneys do not have the shape of coins in our sense, but appear often in the form of tools and weapons.

The region of Tabora in East Africa is known to the natives as *Unyanyembe* (Land of the Hoe), so called after the one hundred and fifty thousand iron hoes (*yembe*) delivered there sixty years ago by the natives of Ussindja and used as monetary units. Spears, knives, and white man's guns have been added as currency. In 1906 the Pangwe established stabilized prices for all major objects of their trade, but although they adopted iron-spear money as their standard currency, other coinages were equally recognized, due to the infusion of various cultural and economic elements from other forms of civilization. This makes it possible to translate native values into equivalent amounts of English money.

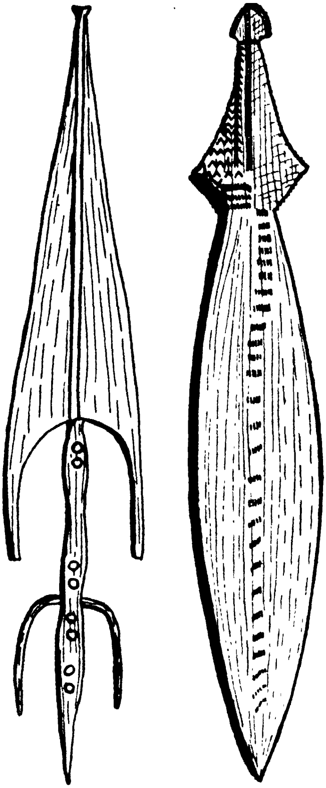
A Pangwe bridegroom in quest of marital happiness, for instance, must make the following payments for his bride :

	£	s.	d.
6000 spears	20	0	0
12 guns	6	0	0
2 barrels of powder		4	0
70 boar tusks	3	0	0
2 sheep	2	10	0
2 iron pots		10	0
10 pieces of cloth	2	0	0
5 hats		12	6
13 pots of salt	1	0	0
2 knives		2	0
2 packages of beads		2	0
2 tobacco pipes		1	0
2 packages of flint		1	0
1 hat full of buttons		1	0
Total	£36	3	6

As we can see, the price for a Pangwe bride is a considerable amount, which often condemns many young Pangwe men to life-long bachelorhood.

For their metal money the African natives never depended on imports from Europe, since the process of producing iron by melting it in furnaces was known to them long before the white man had acquired that knowledge.

The favourite shape of iron money in the form of familiar tools often leads to their reproduction in miniature. The old iron money of the Pangwe, for instance, has the form of diminutive axes, tied together with fibre strings in fan-like fashion. Ten such bundles are worth about a quarter of a dollar. This money, however, is now scarce. Present-day Pangwe currency is made from spear-points whose value depends on size and workmanship. An ordinary iron spear is worth about two cents. Unusually large spears are worth about twenty-five cents. They are particularly used for the purchase of women. An elephant tusk costs about two hundred spears ; a rhinoceros bird, ten spears ; a large rat, ten spears ; a pipe, only one spear ; a soup ladle, two spears ; a European gun,



IRON MONEY
Northern Congo

COPPER COIN
Congo

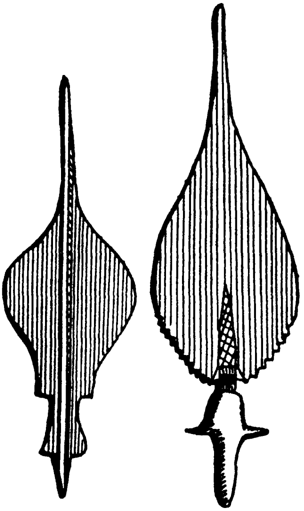
Museum of Ethnology, Cologne

one hundred to two hundred spears; and the moustache of a leopard, ten spears.

The East African Usandaui also use spear money, while the tribes of the Western Bantu prefer axes and spear-points, and the Basongo, throwing knives. The African Pygmies barter with neighbouring tribes for iron-knife and spear-point money. They use the so-called 'silent bartering,' a procedure in which both the prospective buyer and the seller deposit their wares at an appointed spot without ever meeting each other in person.

A curious money circulates along the upper Binus. It consists of nails and pins. In contrast, the Pomo Indians of California preferred neatly polished cones of dolomite or magnesite.

One particular European coin has become very popular with the natives of Africa. It is the 'Maria Theresa taler,' an ancient three-mark piece which entered the Dark Continent via the Near East and the Sudan, penetrating all North Africa and Western Arabia, even passing the Equator. This taler became tremendously popular with the natives, who adore the portly bust-line of the Austrian Empress whose image adorns one side of the coin. Slenderness as a mark of beauty is unknown to the natives of Africa.



SPEAR-POINT MONEY
Fang, West Africa
After G. Tessmann

Other foreign coins which have conquered primitive regions are the Mexican silver dollar, a recognized currency all over the Far East, and the Indian rupee, current in Tibet and East Africa. In some parts of Abyssinia cartridge shells have been accepted as currency, and peaceful commercial transactions are settled with these reminders of wars gone by.

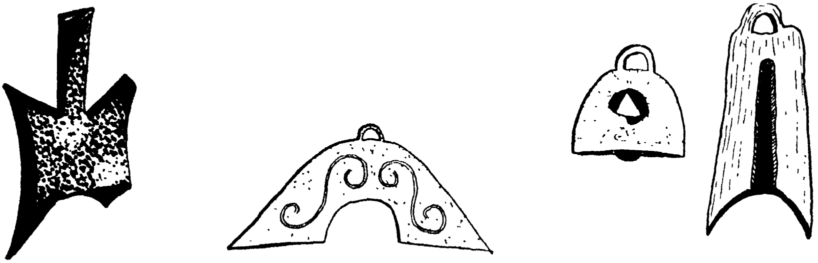
Copper bars in the shape of St Andrew's crosses were a valuable Congo currency. Heavy semicircles of copper are money at Stanley Pool. Beautifully ornamented, such half rings are known in many parts of West Africa. These manillas, as they were called, were a recognized currency, especially in the kingdom of Benin, as their frequent appearance on the famed bronze plates of the sixteenth and seventeenth centuries proves.

MERCHANT WITH MONEY RING
('MANILLA')
Bronze Plate of the Sixteenth Century
Benin, West Africa
Museum of Ethnology, Stuttgart

In ancient China metal money was used in many varied shapes and materials. The oldest Chinese metal currency had the form of a very thin bronze spade, with a hollow centre and a four-sided handle. Bronze bells and other finely cast currencies were manufactured in China as early as 300 B.C. The 'sounding' coins or *K'iow ts'ien* are famous for their half-moon shape, their excellent workmanship, and delicate ornamentation. They were known by the names of 'moon' or 'bridge' money. Even the Chinese word for money, *ts'ien*, which means 'hoe,' is a reminder of the original shape of the oldest Chinese currency.

In south-eastern Asia gongs were used as currency. They served for the purchase of wives and for the payment of fines, but were also used to build up considerable fortunes. Many tribes of western India use metal drums instead. On the island of Celebes brass rings are the native money, while the African Bantu use iron beads; the Basongo, copper and alloy ornaments; and the North American Haida, ornamented copper plates. These 'coppers' were cherished with religious ardour, as is the *diwarra* of the South Seas.

ANCIENT CHINESE BRONZE MONEY

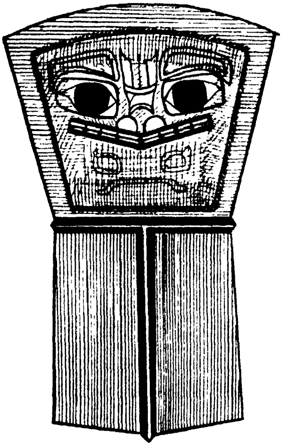


Spade Coin

Bridge or Moon Coin,
K'iow ts'ien

Bell Coins

After O. Münsterberg



ENGRAVED 'COPPER'
Ceremonial Haida Money
Museum of Ethnology, Berlin

The king of all metals, however, has always been gold, and no country on earth has ever resisted its lure. Gold coins as we know them are nowhere manufactured by primitive tribes, although gold bars and gold-dust have been recognized by many peoples as valuable mediums of payment. But even the evaluation of gold varies. There are places on earth where silver is preferred for everyday purchases, while gold is given preference in the selling and buying of precious and beautiful objects. On the African Gold Coast and among the Ashanti, gold-dust was used as money and was weighed with the aid of the famed artistic gold weights of the Ashanti: tiny, bizarre figures of animals and tools of daily life. Gold-dust money circulated in China and in Indo-China and, above all, in that most alluring of all gold countries, ancient Mexico.

Modern civilizations have discarded gold bars as means of exchange between seller and buyer, and have coined them into pieces instead. This, at least, was so until nations were forced to abandon their gold standards altogether. But wherever a genuine gold coin shows up, be it in our modern cities or in the desert of Africa, eager eyes recognize its value.

To those who wonder what has happened to the former American and European gold coins the author is able to report that he personally discovered one of their caches in an oasis of the Western Sahara, where little dancing girls of the Ouled Nail tribe perform their tricks for the pleasure-seeking nomads of the desert. In their tiny houses, built of dried mud, these girls strum their guitars, and whenever they raise their arms, the wide sleeves of silk glide back to expose scores of bracelets made of the gold coins of all civilized nations, coins collected from their friends and customers.

Just as civilized nations authorize the state alone to manufacture money in its mints, most primitive tribes allow only one man or one selected group of men or women to manufacture their currency. For this rôle, many tribes in Africa choose their blacksmith, which helps to explain why he is the most respected member of the tribe, ranking immediately after royalty. At Korintji on Sumatra the privilege of coining copper and brass-ring money is vested in two men especially appointed for the purpose. They have the honorary titles of *Pagawei Djanang* and *Pagawei Radja*, distinctions which they pass on to their sons by inheritance.

' Paper money ' as an addition to coin money is as well known to many primitive tribes as it is common in our form of civilization. While modern coined money has its origin in primitive iron tools and raw metal bars, paper money can be traced back to cloth money and to the mats and hides which circulate as mediums of exchange among many races. Fine hand-woven mats are money on Samoa and in south-east Melanesia. The Yap variety is cruder. It is rolled together and tied to cylinders with fibre strings.

The north-west American Indians traded with blankets, which represented a considerable purchasing power. In Siberia the natives paid their taxes in hides ; many North American Indians used beaver-skins for money ; and the southern tribes traded in raccoon hides. Other skins were used in north-western America, the Tlinkits using moose hides. Wherever this kind of money is in use, cloth money of many varied kinds may also be found to serve the same purpose.

The whole tradition-sanctioned trading ceremony annually performed by the Indians of Labrador, who bring their winter fur harvest to the white traders of the Hudson's Bay Company in order to buy supplies for the coming winter, can be regarded as an example of the use of 'hide money.' Until recently, the valuable fur bundles of these Indians were estimated in terms of 'made beaver' (M.Br.), a remnant from the times of the 'beaver coin' issued by the Company for their Indian trade and representing the value of one prime beaver-skin.

In the Sudan and in Upper Guinea cotton money is in constant circulation. Tibet favours the *chadak*, a silk material used exclusively for making payments. In ancient Japan poets were paid with cloth ; the same custom is known to all readers of the tales of *The Arabian Nights*. As in the case of the glass beads, this money also is often subject to threatening ups and downs caused by changing fashion fads—as, for instance, in northern Senegambia, where the Moors recognize as money only a distinct type of navy-blue Indian cotton cloth which they are able to distinguish from any imitation by its smell.

Another development in the direction of the invention of paper money is the official stamping of money mats by white administrators, as is done by the Portuguese in Angola, who then recognize such stamped mats as legal currency and accept them for payment of taxes.

From this fibre money it is but a small step to the 'real' paper money which is the Western World's most common medium of payment. As far back as the thirteenth century Marco Polo reported the use of paper money by the Great Khan. It consisted of the fibres of the mulberry-tree.

> All this paper is manufactured with great lavishness and publicity, as if it were melted silver and pure gold—because on each piece the body of officials, especially appointed for this purpose, not only sign their names, but also affix their seals. When this has been done in regular order the highest mint master whom His Majesty commissions for this purpose dips the seal entrusted to him in vermilion and stamps therewith the piece of paper. In that manner it receives full sanction as a valid coin, and should any one imitate it he would be punished as a major criminal.

Odd coins shaped from leather were used in China during the Han period, but they gave place to the so-called 'token' money. Token money is similar to the chips used by gamblers to represent money as long as the game is on. China had, and still has to-day, such token moneys of clay, porcelain, or lacquer. During modern Chinese funerals 'the money of the deceased' is symbolically burned—the ghosts who demand this are successfully fooled by scraps of paper replacing genuine bills. In South America

European bus companies used to issue tickets made of gutta-percha which the natives accepted and treated as money.

Almost every ancient type of currency is surrounded by countless myths that tie it up with the gods, the dead ancestors, and the spirits and ghosts living in all objects of nature. These beliefs tend to increase the value of money and stop robbers and forgers. The 'civilized' criminal who holds up a bank is threatened merely with imprisonment; the primitive robber of money, however, is doomed and exposed to the wrath of the gods, a punishment of eternity which makes this type of crime almost non-existent among most tribes.

The natives of the Papao Islands, like many other primitives, consider their currency of heavenly origin, created by mystical birds and fishes and hidden by them along the beaches of mysterious islands. When this money changes hands a surtax is added so as to appease 'the feelings of the coin.'

In Mecca, the centre of Islam, most women carry a cherished holy charm made of ancient Venetian gold coins showing the image of Christ and of San Marco. In Tibet, Indian rupee coins are used in the same way, but their religious value is due to a pious error, for the image of Queen Victoria is taken for the head of the Dalai Lama.

The copper plates of the American north-west coast were individually named. They were kept in their 'own house' and even received daily food. Women were strictly forbidden to enter such a house. The 'coppers' themselves supposedly came from the man in the moon as a present for his fellow-tribesmen; others believed that they were brought by a mighty chieftain whose magic castle was in the sea.

This religious veneration of money differs considerably from our own cult of the god Mammon, for it reaches much deeper into the soul of primitive men than the modern desire to grasp as great an amount as possible of the indispensable dollar.

All over the world there are careful savers as well as spendthrifts. Just as in our own case, the Melanesian Islander is at liberty either to squander his riches or to deposit them carefully in his savings bank, built in the centre of the village for the safekeeping of money with an official watching the precious shell strings. People part with their *diwarra* with the same feeling of reluctance and regret that we have when we part with our shillings. The effect is the same all over the world, whether the Salaga customer keeps twenty thousand cowries in his fibre purse as small change, or the Pangwe carries his iron money in string bags on his arms, or the Abyssinian takes his cartridge shells from a European cartridge bag. And it is as easy to lose in gambling when, among the African Bassaris, the cowrie falls wrong side up, as it is in Monte Carlo when the croupier's rake pulls in one's stake.

Even the dead in their graves are not safe from their creditors. The relatives of a deceased Ewe tribesman cover his body with cowries so that all rightful creditors may collect their share. Taxes are a nuisance everywhere, no matter whether they are paid in dollars or in shell money, in mats or in edibles. In Bornu every male citizen has to pay one thousand shells for taxes, each pack ox is taxed with an additional thousand shells as ' sales tax,' and for each slave there exists a ' luxury tax ' of two thousand shells.

But each region has its own financial tycoon. The African king of Nassakama sold his land to the African Company, Ltd, for a yearly pension of three hundred thousand cowries.

Exchange speculators are the cleverest wizards of all, and many of them show their skill in primitive societies. A native of the Ashanti tribe was astute enough to trade in all his cowrie money in the year 1860 at the rate of one dollar for eighty-five strings. He waited thirty-six years, until the exchange rate had risen to two hundred and sixteen strings for one dollar, to buy himself a new fortune of cowries and become the wealthiest man of his people.

Hashash, an iron coin, was officially introduced in Kordofan in 1820. In the Sulu Archipelago the sultan stabilized the exchange rate of certain cotton pieces used as currency, and the rate was determined in such a way that it never changed again, regardless of increasing or diminishing imports.

When an inflation threatens a primitive tribe, caused by a change of fashion or by excessive imports of new values, a wise financial policy is the only means of saving the investors' property—just as in our civilization. This happened, for instance, in the year 1840, when Shah Omar of Bornu decreed that the Maria Theresa taler and the Spanish dollar would henceforth be legal tender and that cowrie shells should become the official small change—thus eliminating all inflationary tendencies of other mediums of exchange.

But deflation can also threaten the economic stability of a people. An interesting example occurred during the Second World War, and has been reported by official Netherlands sources in the Dutch East Indies :

> To the Indonesians of this remote outpost gold and silver have no value, the accepted money long having been beautiful coloured sea-shells formerly brought from long distances over dangerously

> precipitous mountain trails. As the shells are fragile the money supply naturally must be renewed from time to time.
>
> However, the shores where these particular shells can be found were in Japanese hands. As a result, deflation threatened the district with disruption of the entire economic system because of the acute shortage of 'money.'
>
> Finally, in despair, Dutch officials administering the district delegated an officer to Australia in an effort to solve the problem. The Netherlands East Indies Commission then sent men to comb the Australian beaches, but without success. Then one day an official joyfully burst into the offices of the Commission, shouting: "No more deflation. I've found money."
>
> He led the astonished Dutch officials to Melbourne's leading department store, where the shiny shells were sold as toys for Australian children. The Netherlands administrator returned to his district bearing bag after bag of the shiny shells, restoring happiness and prosperity to the people.

Only a very few tribes on earth do not depend to some extent on money to cover the necessities of their existence. Among them are the Australian hunters and food gatherers, who know neither poverty nor fortune. But as soon as the economic form of a society assumes more involved and complicated aspects the conception of money enters the people's lives. It is merely a matter of chance and locality whether such money consists of shells, stones, hides, or metals. The pains of poverty and the power of wealth remain the same to all who have discovered the secrets of selling and buying.

CHAPTER NINE

From Tom-tom to Newspaper

EXPLORERS, ENTERING REGIONS no white man's foot has ever touched before, are amazed to find that the natives of the deserts, the prairies, and the jungles often receive them without surprise and in some cases even have quarters and food ready for the members of the expedition. Questions about how these people learnt of the approaching visitors are answered with a vague and evasive : " We were told," or, simply, " We knew." How does primitive man in the deepest wilderness without modern systems of communication obtain this information ?

Many a sheep farmer in Australia has been mystified by the sudden disappearance of his loyal native workers who, after a few days of absence, return to work as though nothing had happened, furnishing after long hesitancy the explanation : " We were summoned home by our tribe under penalty of death if we should not follow the call." What call ? How were they notified in the barren wilderness of the Australian bush ?

Civilized man, venturing into the wilderness, must reckon with the fact that a perfect system of wireless telegraphy has been invented and perfected by primitive men. Their ancient methods of disseminating news are foolproof ; short circuits, static disturbances, magnetic storms, or strikes never impair their efficiency. The struggle for life is merciless in the wide-open spaces, and the speed with which the news is received and passed on may save or doom human lives. The white man can scarcely hope to learn all secrets of the native codes, but, taking notice of their intricate and perfect nature, he cannot help but admire the brains that originated them.

The simplest medium of communication is, of course, language. It leads to the development of other acoustic methods of news communication. In contrast to these acoustic methods initiated by language, there are optical means of broadcasting news which furnish in their development the link to the beginnings of script. Radio and newspaper—the approach through the ear and by the eye—are our own two principles used for disseminating news. Even though their means of expression have been magnificently perfected to-day, these same two principles have served the same purpose since the dawn of time. Among primitive methods, we find that acoustics — language and sound — is used by societies